Al-Jahiz: Journal of Biology Education Research
ISSN 2722-5070 (Print) ISSN 2722-5275 (Online)
Vol. 7 No. 1 January-June 2026
Available online at:
http://e-journal.metrouniv.ac.id/index.php/Al-Jahiz

Local Food-Based Mediterranean-Style Nutrition Education Improves Dietary Adherence, Sleep Quality, and Psychological Wellbeing Among Third-Trimester Pregnant Women

Dwi Rahmawati[1]*, Wahyu Indah Dewi Aurora[2], Liani Styarsih[3], Andika Sulistiawan[4]
[1,3] Universitas Adiwangsa Jambi
Sersan Muslim Street, RT 24, Thehok, South Jambi District, Jambi City, Jambi, Indonesia
[2,4] Universitas Jambi
Km 15 Jambi–Muara Bulian Road, Mendalo Darat Village, Jambi Luar Kota District, Muaro Jambi Regency, Jambi, Indonesia
*Coresponding author: dwirahmawati.jmb@gmail.com

Article Information

Article History:
Received: January 29, 2026
Revised: March 04, 2026
Published: April 13, 2026

Keywords:
Local food, Mediterranean-style diet, Dietary adherence; Sleep quality, Psychological wellbeing

ABSTRACT

Maternal nutrition is shaped by cultural food knowledge and local biodiversity, yet these factors are rarely integrated into dietary interventions for pregnant women. This study aimed to evaluate the effects of a local food–based Mediterranean-style nutrition education program on dietary adherence, sleep quality, and psychological wellbeing among third-trimester pregnant women, and to examine the association between ethnobiological literacy and dietary adherence. A quasi-experimental pretest–posttest design was conducted in Jambi City, Indonesia, involving 168 participants (84 intervention; 84 control) selected through accidental sampling. The intervention group received locally adapted Mediterranean-style nutrition education for 30 days, while the control group received standard antenatal nutrition counseling. Results showed significant improvements in the intervention group, including increased Mediterranean Diet Adherence Screener (MEDAS) scores (6.1 ± 1.4 to 9.2 ± 1.6; $p < 0.001$), improved sleep quality indicated by lower Pittsburgh Sleep Quality Index (PSQI) scores (7.8 ± 2.1 to 5.1 ± 1.8; $p < 0.001$), and higher psychological wellbeing measured using the WHO-5 Well-Being Index (46.7 ± 8.9 to 58.3 ± 9.7; $p < 0.001$). The control group showed minimal and non-significant changes. These findings suggest that nutrition education integrating local food resources with Mediterranean-style dietary principles can improve maternal dietary behavior and wellbeing.

How to Cite
Rahmawati, D., Aurora, W. I D., Styarsih, L., Sulistiawan, A. (2026). Local Food-Based Mediterranean-Style Nutrition Education Improves Dietary Adherence, Sleep Quality, and Psychological Wellbeing Among Third-Trimester Pregnant Women. *Al Jahiz: Journal of Biology Education Research*. 7(1), 122–139. DOI: https://doi.org/10.32332/al-jahiz.v7i1.13067.

Published by
Al-Jahiz: Journal of Biology Education Research
Website
https://e-journal.metrouniv.ac.id/index.php/Al-Jahiz/index

Al-Jahiz: Journal of Biology Education Research
ISSN 2722-5070 (Print) ISSN 2722-5275 (Online)
Vol. 7 No. 1 January-June 2026
Available online at:
http://e-journal.metrouniv.ac.id/index.php/Al-Jahiz

INTRODUCTION

Maternal nutrition fosters the health and well-being of both the mother and the developing fetus. Adequate maternal nutrition is essential for positive pregnancy outcomes, influencing gestation length, birth weight, and neonatal health (Hunter et al., 2019). Adequate maternal nutrition is imperative for positive pregnancy outcomes, impacting gestation length, birth weight, and neonatal health (Hunter et al., 2019). A review indicates that nutritional status during pregnancy significantly influences maternal and infant morbidity and mortality (Saensouk et al., 2025). The nutritional needs of pregnant women are unique and necessitate a diet that ensures sufficient intake of essential vitamins and minerals (Sidiq et al., 2022). However, maternal dietary intake is not determined solely by nutritional knowledge but is also influenced by cultural beliefs, taboos, and traditional practices that shape food selection and dietary restrictions. In many societies, certain foods are avoided during pregnancy due to cultural narratives or misconceptions regarding their potential effects on fetal growth or maternal health (Tremblay et al., 2020).

Food culture is instrumental in shaping dietary behaviors during pregnancy as it encompasses local food practices that are often intertwined with identity and heritage. Traditional culinary practices not only preserve cultural values but also govern nutritional decisions (Alrhmoun et al., 2025). Studies related to local food systems indicate that locally available food resources contribute to dietary diversity and nutritional adequacy while supporting culturally appropriate dietary practices (Mabhaudhi et al., 2019).

Adapting a Mediterranean diet using local food sources such as tempeh, moringa, river fish, and spices is grounded in cultural relevance and nutrition science (Alharbi, 2025b). The Mediterranean diet refers to a dietary pattern characterized by high consumption of vegetables, fruits, legumes, nuts, whole grains, and olive oil as the main source of fat, with moderate intake of fish and dairy products, and low intake of red meat and highly processed foods (Alharbi, 2025b). In this study, the Mediterranean diet is not applied as a strict cultural replication of the traditional Mediterranean region; rather, it is used as a nutritional framework emphasizing plant-based, minimally processed, and nutrient-dense foods. This approach is relevant to the local context because many of its key principles can be adapted using locally available foods and traditional dietary practices, enabling culturally appropriate nutrition education while maintaining the health-promoting components of the Mediterranean dietary pattern.

This model promotes the consumption of biodiverse foods that are rich in phytochemicals, antioxidants, and beneficial fatty acids while maintaining ecological integrity (Iskandar et al., 2023).

The local Mediterranean diet, enriched with these indigenous foods, demonstrates significant health benefits and fosters sustainable food systems by prioritizing local biodiversity (Arrivabene et al., 2024). Research indicates that such adaptations not only safeguard nutritional adequacy but also promote ecological resilience through sustainable agricultural practices like agroecology that align with both health and environmental goals (Haq et al., 2023).

Despite growing evidence supporting culturally adapted dietary interventions, there remains a gap in integrating food culture and local food knowledge into structured maternal nutrition education programs. Many studies focus primarily on clinical nutrition outcomes without fully considering cultural dietary knowledge, which may influence dietary adherence and long-term behavioral change (Vayona et al., 2025). Additionally, the literature reveals a lack of comprehensive research assessing how cultural food knowledge influences dietary adherence, particularly concerning pregnant women (Fernández-Llamazares et al., 2021). There is also limited evidence on how community-based biology and nutrition education can incorporate local food knowledge to improve maternal health behaviors (Borelli et al., 2020).

Intervening in local knowledge can be considered part of an ethnobiology-informed approach, particularly within an educational context. Ethnobiology does not only document traditional ecological knowledge, but it can also contribute to knowledge translation and community-based learning by strengthening how local biological resources are understood and utilized for health and wellbeing. In this study, the intervention focuses on enhancing participants' understanding of local food biodiversity, culturally embedded dietary beliefs, and healthier food choices using locally available biological resources. The educational content emphasized practical dietary guidance using familiar local foods aligned with Mediterranean-style dietary principles to improve maternal dietary behavior, sleep quality, and psychological wellbeing.

Therefore, this study aimed to assess local food knowledge and food-culture beliefs among pregnant women and to evaluate the effects of a locally adapted Mediterranean-style nutrition education intervention on dietary adherence, sleep quality, and psychological well-being. In addition, this study evaluates the effects of a locally adapted Mediterranean-style diet intervention on maternal sleep quality and psychological well-being (Medeiros et al., 2022). By examining associations between local food knowledge, cultural food beliefs, and dietary adherence, this research contributes to both scientific understanding and practical applications in maternal nutrition and health promotion, helping to address gaps in existing literature (Durazzo, 2019).

Al-Jahiz: Journal of Biology Education Research
ISSN 2722-5070 (Print) ISSN 2722-5275 (Online)
Vol. 7 No. 1 January-June 2026
Available online at:
http://e-journal.metrouniv.ac.id/index.php/Al-Jahiz

RESEARCH METHODS

This study was designed as a quasi-experimental nutrition education intervention with a pretest–posttest control group design. Participants were recruited during antenatal care visits at community health centers in Jambi City. Because random allocation was not feasible in the field setting, participants were assigned to the intervention and control groups based on the health centers where they received antenatal care services. Two health centers were designated as intervention sites and two as control sites to minimize contamination between groups. Baseline characteristics were assessed to ensure comparability between groups, and statistical adjustments were applied during analysis to control for potential confounding variables. The educational program aimed to improve participants' understanding of balanced nutrition, healthy food choices, and the nutritional value of locally available foods, aligned with Mediterranean-style dietary principles.

The research was conducted in Jambi City, Indonesia, involving third-trimester pregnant women. A total of 168 participants were recruited, consisting of 84 participants in the intervention group and 84 participants in the control group. The control group received standard antenatal nutrition counseling routinely provided at community health centers. The counseling was delivered by health workers during routine antenatal care visits and consisted of brief face-to-face sessions lasting approximately 10–15 minutes. The content focused on general recommendations for balanced nutrition during pregnancy, iron supplementation, and healthy dietary practices according to national maternal health guidelines. Unlike the intervention group, the control group did not receive structured educational modules, culturally adapted Mediterranean-style dietary guidance, or additional educational materials.

The intervention consisted of a structured nutrition education program delivered over a 30-day period. Participants attended four educational sessions, each lasting approximately 45–60 minutes, conducted in small groups. The sessions were delivered through interactive discussions, visual materials, and practical examples of locally available foods aligned with Mediterranean-style dietary principles.

The program was delivered by trained nutrition educators who received prior orientation regarding the intervention protocol and educational materials. The educational materials included illustrated booklets and visual aids describing local food sources, recommended dietary patterns, and practical meal planning strategies. Intervention fidelity was maintained using standardized teaching materials and monitoring by the research team to ensure consistent delivery of the

educational content. Participants were encouraged to apply the dietary recommendations in their daily meals throughout the intervention period.

Participants were recruited during antenatal care visits at community health centers using an accidental (convenience) sampling approach. A total of 192 pregnant women were approached for participation. Of these, 176 met the eligibility criteria, and 168 agreed to participate and were enrolled in the study. Eight participants were excluded due to incomplete data or withdrawal during the study period. Although convenience sampling may introduce selection bias, baseline characteristics were assessed to ensure comparability between groups, and statistical adjustments were applied during analysis to minimize potential confounding.

The nutrition education intervention incorporated locally available plant- and animal-based food sources familiar to participants. The educational materials emphasized practical dietary guidance using locally available foods and culturally familiar dietary practices to improve dietary adherence and maternal health outcomes.

Data were collected using validated measurement instruments. Dietary adherence was assessed using a locally adapted Mediterranean Diet Adherence Screener (MEDAS), which incorporated regionally relevant foods such as tempeh, freshwater fish, moringa leaves, coconut oil, and Indonesian spices. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), and psychological well-being was measured using the WHO-5 Well-Being Index. In addition, local food knowledge and food-culture beliefs were assessed using a researcher-developed Ethnobiological Knowledge and Food-Culture Beliefs Scale (EK-FCBS). All instruments were administered at baseline and after the 30-day intervention period.

The Ethnobiological Knowledge and Food-Culture Beliefs Scale (EK-FCBS) was developed by the research team to assess participants' knowledge and beliefs regarding local food resources and culturally embedded dietary practices. The instrument consisted of 24 items grouped into three domains: Traditional Food Knowledge (8 items), Food-Culture Beliefs (8 items), and Local Biodiversity Utilization (8 items). Responses were recorded using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Content validity of the instrument was evaluated by three experts in nutrition, public health, and ethnobiology. Construct validity was assessed through item–total correlation analysis, with all items meeting acceptable validity criteria ($r > 0.30$). The instrument demonstrated good internal consistency reliability, with a Cronbach's alpha coefficient of 0.87 for the overall scale.

Al-Jahiz: Journal of Biology Education Research
ISSN 2722-5070 (Print) ISSN 2722-5275 (Online)
Vol. 7 No. 1 January-June 2026
Available online at:
http://e-journal.metrouniv.ac.id/index.php/Al-Jahiz

Data analysis was conducted using IBM SPSS Statistics Version 26. Descriptive statistics were used to summarize participant characteristics and baseline variables. Normality testing was performed using the Shapiro–Wilk test. Within-group changes before and after the intervention were analyzed using paired t-tests. Between-group differences were analyzed using independent t-tests or continuous variables and chi-square tests for categorical variables to assess group comparability prior to the intervention and analysis of covariance (ANCOVA) to adjust for potential confounding variables. Associations between local food knowledge and dietary adherence were examined using Pearson or Spearman correlation coefficients, and multiple linear regression analysis was performed to identify predictors of improved dietary adherence and maternal health outcomes. Statistical significance was set at $p < 0.05$.

Analysis of covariance (ANCOVA) was used to compare post-intervention outcomes between the intervention and control groups while adjusting for potential confounding variables. The covariates included baseline values of the respective outcome variables, maternal age, education level, and parity. Prior to analysis, statistical assumptions for ANCOVA were examined, including normality of residuals, homogeneity of variance, linearity, and homogeneity of regression slopes.

Effect sizes were calculated using partial eta squared (η^2) to estimate the magnitude of the intervention effect. In addition to p-values, 95% confidence intervals (CIs) were reported to provide a more comprehensive interpretation of the results.

Ethical approval for this study was obtained from the Health Research Ethics Committee of the Jambi Polytechnic of Health (Approval Number: LB.02.06/2/777/2025). Written informed consent was obtained from all participants prior to data collection, and participant confidentiality and anonymity were strictly maintained throughout the study.

RESEARCH RESULT

From the result in Table 1 presents the baseline characteristics of participants in the intervention and control groups, indicating that both groups were generally comparable before the intervention. Most participants were aged 25–34 years, representing 58.3% of the intervention group and 63.1% of the control group, while mothers aged ≥35 years accounted for 21.4% and 14.3%, respectively. In terms of education, a higher proportion of mothers in the intervention group had low educational attainment (76.2%) compared to the control group (64.3%), whereas higher education was more common in the control group (35.7% vs. 23.8%). Most participants were housewives in both groups (71.4% in the intervention group and 64.3% in the control group).

Al-Jahiz: Journal of Biology Education Research
ISSN 2722-5070 (Print) ISSN 2722-5275 (Online)
Vol. 7 No. 1 January-June 2026
Available online at:
http://e-journal.metrouniv.ac.id/index.php/Al-Jahiz

Primiparous mothers were more frequent in the control group (41.7%) than in the intervention group (31.0%), while multiparous mothers dominated the intervention group (69.0% vs. 58.3%). Differences were also observed in psychological well-being, with a greater proportion of mothers in the intervention group having good WHO-5 scores (>50) at 54.8% compared to 33.3% in the control group. Similarly, adherence to the Mediterranean diet was higher in the intervention group, where 57.1% achieved high adherence (≥9) compared to 39.3% in the control group.

Baseline comparisons indicated no statistically significant differences between the intervention and control groups in most sociodemographic characteristics ($p > 0.05$). However, slight differences were observed in baseline WHO-5 and MEDAS categories; therefore, baseline values of these variables were included as covariates in the subsequent ANCOVA analyses.

Tabel 1. Characteristics of Participants

Characteristics	Intervention Group	Control Group	p-value*
Age group			
18–24 years	17 (20.2%)	19 (22.6%)	
25–34 years	49 (58.3%)	53 (63.1%)	0.78
≥35 years	18 (21.4%)	12 (14.3%)	
Education level			
Low (≤ Senior High)	64 (76.2%)	54 (64.3%)	0.11
High (Diploma–Bachelor)	20 (23.8%)	30 (35.7%)	
Employment status			
Housewives	60 (71.4%)	54 (64.3%)	0.34
Working (formal/informal)	24 (28.6%)	30 (35.7%)	
Parity Status			
Primipara	26 (31.0%)	35 (41.7%)	0.15
Multipara	58 (69.0%)	49 (58.3%)	
Psychological well-being			
Good (>50)	46 (54.8%)	28 (33.3%)	0.04
At risk (≤50)	38 (45.2%)	56 (66.7%)	
Mediterranean diet adherence (MEDAS)			
High (≥9)	48 (57.1%)	33 (39.3%)	0.03
Low (<9)	36 (42.9%)	51 (60.7%)	

*Note: * p-values were calculated using chi-square tests to compare baseline characteristics between groups.*

Table 2 compares local food knowledge and food-culture beliefs between the intervention and control groups. Participants in the intervention group demonstrated significantly higher scores in Traditional Food Knowledge (27.4 ± 3.1) compared to the control group (26.2 ± 3.4; $p = 0.03$). Similarly, Local Biodiversity Utilization scores were significantly higher in the intervention group (28.5 ± 3.3 vs. 26.7 ± 3.6; $p = 0.01$). In contrast, Food-Culture Beliefs scores were comparable between groups (25.1 ± 2.9 vs. 24.8 ± 3.0; $p = 0.48$). Overall, the total EK-FCBS score was significantly higher in the intervention group (80.9 ± 7.2) compared to the control group (77.7 ±

Al-Jahiz: Journal of Biology Education Research
ISSN 2722-5070 (Print) ISSN 2722-5275 (Online)
Vol. 7 No. 1 January-June 2026
Available online at:
http://e-journal.metrouniv.ac.id/index.php/Al-Jahiz

7.9; p = 0.02), indicating stronger local food knowledge and culturally grounded dietary understanding among intervention participants.

Table 2. Ethnobiological Knowledge and Food-Culture Beliefs (EK-FCBS)

EK-FCBS Domain	Intervention Mean ± SD	Control Mean ± SD	p-value
Traditional Food Knowledge	27.4 ± 3.1	26.2 ± 3.4	0.03*
Food-Culture Beliefs	25.1 ± 2.9	24.8 ± 3.0	0.48
Local Biodiversity Utilization	28.5 ± 3.3	26.7 ± 3.6	0.01*
Total EK-FCBS Score	80.9 ± 7.2	77.7 ± 7.9	0.02*

* Significant at $p < 0.05$

Table 3 summarizes the pre- and post-intervention changes in Mediterranean diet adherence (MEDAS), sleep quality (PSQI), and psychological well-being (WHO-5) in both the intervention and control groups, showing significant improvements only among participants who received the local Mediterranean diet program. The intervention group demonstrated a marked increase in diet adherence, rising from a mean MEDAS score of 6.1 ± 1.4 at baseline to 9.2 ± 1.6 after the intervention, with a mean change of +3.1 ($p < 0.001$), while the control group showed only a minimal and non-significant improvement. Sleep quality also improved substantially in the intervention group, as indicated by a decrease in PSQI scores from 7.8 ± 2.1 to 5.1 ± 1.8 ($p < 0.001$), whereas the control group experienced negligible change. Similarly, psychological well-being, measured by the WHO-5, increased significantly in the intervention group from 46.7 ± 8.9 to 58.3 ± 9.7, showing a mean improvement of +11.6 ($p < 0.001$), while the control group exhibited only a small, non-significant increase. Overall, these findings highlight that the culturally adapted Mediterranean diet intervention was effective in enhancing dietary adherence, sleep quality, and psychological well-being among pregnant women.

Table 3. Changes in Diet Adherence (MEDAS), Sleep Quality (PSQI), and Psychological Well-Being (WHO-5) Before and After the Intervention

Variable	Group	Pretest Mean ± SD	Posttest Mean ± SD	Mean Change	p-value
MEDAS (Diet Adherence)	Intervention	6.1 ± 1.4	9.2 ± 1.6	+3.1	<0.001*
	Control	6.0 ± 1.5	6.4 ± 1.6	+0.4	0.08
PSQI (Sleep Quality)	Intervention	7.8 ± 2.1	5.1 ± 1.8	–2.7	<0.001*
	Control	7.6 ± 2.3	7.3 ± 2.1	–0.3	0.24
WHO-5 (Well-Being)	Intervention	46.7 ± 8.9	58.3 ± 9.7	+11.6	<0.001*
	Control	47.2 ± 9.1	49.1 ± 9.4	+1.9	0.10

* Significant at $p < 0.05$

Correlation and regression analyses demonstrated that local food knowledge and culturally grounded dietary understanding were important factors influencing adherence to the local

Al-Jahiz: Journal of Biology Education Research
ISSN 2722-5070 (Print) ISSN 2722-5275 (Online)
Vol. 7 No. 1 January-June 2026
Available online at:
http://e-journal.metrouniv.ac.id/index.php/Al-Jahiz

Mediterranean-style diet (Table 4). All EK-FCBS domains showed significant positive correlations with dietary adherence. The strongest association was observed for the total EK-FCBS score ($r = 0.51$, $p < 0.001$), followed by Local Biodiversity Utilization ($r = 0.47$, $p < 0.001$) and Traditional Food Knowledge ($r = 0.42$, $p < 0.001$). Food-Culture Beliefs showed a weaker but still significant correlation ($r = 0.29$, $p = 0.004$).

Multiple linear regression analysis further confirmed that total EK-FCBS score ($\beta = 0.38$, $p < 0.001$) and participation in the nutrition education intervention ($\beta = 0.44$, $p < 0.001$) were significant predictors of higher post-intervention Mediterranean diet adherence. In contrast, age, education level, and parity were not significant predictors. The regression model explained 48% of the variance in dietary adherence ($R^2 = 0.48$), indicating that both local food knowledge and intervention exposure were key determinants of adherence.

Multiple linear regression analysis was conducted to identify predictors of dietary adherence after the intervention. The dependent variable was the post-intervention Mediterranean Diet Adherence Screener (MEDAS) score. Baseline MEDAS score was included as a covariate to control for pre-existing differences between participants. Other independent variables included total EK-FCBS score, intervention participation, maternal age, education level, and parity.

Model diagnostics were performed to assess the assumptions of linear regression. Multicollinearity was examined using variance inflation factors (VIF), with all values below the acceptable threshold of 5. Residual plots were inspected to assess normality and homoscedasticity. Regression coefficients were reported with their corresponding 95% confidence intervals (CIs) and p-values.

Table 4. Correlation and Regression Analysis of EK-FCBS and Mediterranean Diet Adherence

Analysis Component	Variable/Domain	r-value/β	p-value	Interpretation
Correlation Analysis (EK-FCBS vs. MEDAS Adherence)	Traditional Food Knowledge (TFK)	r = 0.42	<0.001*	Moderate positive correlation
	Food-Culture Beliefs (FCB)	r = 0.29	0.004*	Weak–moderate correlation
	Local Biodiversity Utilization (LBU)	r = 0.47	<0.001*	Moderate correlation
	Total EK-FCBS Score	r = 0.51	<0.001*	Strongest correlation
Regression Analysis (Predictors of Posttest MEDAS Score)	EK-FCBS Total Score	β = 0.38	<0.001* 95% CI : 0.22–0.54	Strongest predictor
	Intervention participation	β = 0.44	<0.001* 95% CI : 0.29–0.59	Significant predictor

Al-Jahiz: Journal of Biology Education Research
ISSN 2722-5070 (Print) ISSN 2722-5275 (Online)
Vol. 7 No. 1 January-June 2026
Available online at:
http://e-journal.metrouniv.ac.id/index.php/Al-Jahiz

Analysis Component	Variable/Domain	r-value/β	p-value	Interpretation
	Age	β = 0.06	0.41 95% CI : -0.08–0.19	Not significant
	Education level	β = 0.09	0.28 95% CI : -0.07–0.24	Not significant
	Parity	β = 0.04	0.56 95% CI : -0.10–0.18	Not significant
Model Summary	R^2 = 0.48	—	—	48% of adherence explained by ethnobiology + intervention

The results of this study indicate that the local food–based Mediterranean-style nutrition education intervention significantly improved dietary adherence, sleep quality, and psychological well-being among pregnant women, while local food knowledge and culturally grounded dietary understanding contributed to improved adherence to the dietary program.

DISCUSSION

The findings from the study reveal that the implementation of a local Mediterranean diet intervention led to notable improvements in several key health indices, specifically the Mediterranean Diet Adherence Score (MEDAS), Pittsburgh Sleep Quality Index (PSQI), and World Health Organization-5 Well-Being Index (WHO-5) among participants. Previous studies have demonstrated that dietary interventions can effectively improve adherence to Mediterranean dietary patterns and promote healthier lifestyle behaviors. Emerging evidence also suggests that higher adherence to Mediterranean-style diets is associated with improved sleep quality and psychological well-being. The present findings extend this evidence by demonstrating that integrating ethnobiological knowledge and locally available foods into nutrition education may enhance the cultural relevance and acceptability of dietary interventions. While evidence specifically examining ethnobiology-informed dietary education remains limited, the current study provides preliminary support for the potential role of culturally grounded nutrition education in improving maternal dietary adherence and wellbeing. (Salamanca et al., 2021; Ünal & Özenoğlu, 2024). However, other study while high quality, do not directly support the claims made regarding the specific impact of the local Mediterranean diet intervention and its correlation with EK-FCBS (Alharbi, 2025a; Godos et al., 2024). Ethnobiology helped localize the Mediterranean diet principles using local foods, making the intervention culturally relevant and improving acceptability.

Local food knowledge and cultural beliefs have influence on individual eating behaviors, particularly among pregnant women. This is evident from studies showing that food taboos and internalized cultural beliefs can reduce dietary diversity and quality, ultimately having negative effects on maternal nutritional status and fetal health (Mohammed et al., 2019; Tsegaye et al., 2021). For example, findings from Ethiopia indicate that cultural prohibitions against consuming certain foods during pregnancy may contribute to anemia, highlighting the importance of understanding cultural contexts in planning nutritional interventions (Chowdhury et al., 2022; Mohammed et al., 2019). Ethnobiological studies further demonstrate that cultural food knowledge and traditional ecological knowledge (TEK) in shaping dietary patterns, with cultural keystone foods often serving as a bridge between cultural identity and biodiversity conservation (McNamara & Wood, 2019; Rayna et al., 2024). This underscores the potential of culturally grounded diets to enhance public health in a broader context.

Traditional ecological knowledge regarding the use of local food resources supports the growing field of biodiversity-based nutrition research, which emphasizes of biological diversity in meeting nutritional needs. Higher scores on the Ethnobiological Knowledge and Food-Culture Beliefs Scale (EK-FCBS) have been shown to improve a mother's ability to adhere to healthy diets, as deeper understanding of the nutritional value of traditional foods strengthens mechanisms that support positive dietary behavior change (Chakrabarti & Chakrabarti, 2019; Tsegaye et al., 2020).

The improvements observed in sleep quality, as measured by the Pittsburgh Sleep Quality Index (PSQI), and psychological well-being, indicated through the WHO-5 well-being index, are consistent with findings from studies involving pregnant populations. For instance, the IMPACT-BCN trial demonstrated that adherence to a Mediterranean diet during pregnancy led to significant reductions in perceived stress and improved well-being, aligning with the outcomes of local dietary interventions that emphasize antioxidant-rich and anti-inflammatory foods. The mechanisms underlying these positive effects can be attributed to bioactive compounds found in foods commonly consumed in Mediterranean and local diets, which are high in omega-3 fatty acids, tryptophan, and antioxidants. These compounds can help stabilize metabolic and hormonal functions, ultimately influencing both sleep quality and mood stability (Casas et al., 2023). By integrating nutrient-dense and culturally relevant foods, this dietary model not only preserves the protective health benefits of the Mediterranean diet but also enhances overall maternal health by addressing sleep disturbances and psychological stressors. The adaptation of local food sources within the Mediterranean framework reinforces both cultural heritage and nutritional efficacy,

ensuring sustainable dietary practices that cater to the specific needs of local populations while promoting health.

Utilizing local biodiversity significantly enhances the acceptance and affordability of dietary practices by prioritizing the integration of indigenous food sources such as tempeh, moringa, river fish, and a variety of Indonesian spices. These foods not only reflect cultural preferences and traditional culinary practices but also provide vital nutrients essential for health, leading to improved dietary diversity within communities. For instance, tempeh offers a rich source of protein and probiotics, while moringa is celebrated for its high antioxidant content and associated health benefits (Pailaha, 2023). Such incorporation of local ingredients correlates with educational efforts that emphasize the importance of local ecosystems and cultural knowledge in sustainable food systems.

The findings highlight the potential application of Ethnobiological Food Culture Beliefs Scale (EK-FCBS) as an educational and assessment tool to support culturally grounded nutrition education. Integrating culturally relevant food knowledge into maternal health education programs may improve awareness of local food nutritional value and support healthier dietary behavior. Community-based health education programs, such as antenatal classes and maternal health education services, may benefit from incorporating local food knowledge to improve maternal nutrition outcomes (Niu et al., 2019; Stagg & Dillon, 2022).

Incorporating local food knowledge into community-based health education may strengthen community engagement and support sustainable dietary behavior. Improving biological and nutrition literacy through culturally relevant education may enhance long-term intervention effectiveness and improve maternal and child health outcomes (Austin, 2022; Linderwell et al., 2024).

This study contributes to the existing body of knowledge on maternal nutrition and culturally adapted dietary interventions by demonstrating the importance of local food knowledge and cultural dietary beliefs in supporting dietary adherence and maternal health outcomes. The integration of locally available foods into nutrition education programs highlights the potential of culturally grounded dietary education to improve maternal health outcomes and support public health nutrition programs (Chandrasekara & Jayasinghe, 2022). Furthermore, this study emphasizes the integration of local biodiversity into health education strategies, illustrating how culturally relevant dietary practices can lead to improved maternal health outcomes. This innovative inclusion not only highlights the importance of local food sources such as tempeh and

moringa but also underscores the potential for using community-based biology education methodologies to enhance food literacy and nutritional awareness. The implications of these findings provide a valuable framework for public health initiatives aiming to improve maternal nutrition through culturally tailored interventions, thus fostering better health behaviors and reducing nutrition-related issues in vulnerable populations (Rosas et al., 2019; Sweileh, 2024).

This study has several limitations that should be considered when interpreting the findings. First, dietary adherence, sleep quality, and psychological well-being were assessed using self-report instruments, which may be subject to reporting bias. Second, the intervention period and follow-up duration were relatively short (30 days), which may limit the ability to evaluate the long-term sustainability of the observed behavioral changes. Future studies with longer follow-up periods are needed to assess whether improvements in dietary adherence and wellbeing are maintained over time. Social biases can inherently influence self-reported measures, potentially skewing the assessment of dietary adherence and participant experiences (Murakami et al., 2024; Taylor et al., 2019). The relatively brief intervention period of 30 days may not allow for the complete evaluation of the longer-term effects of the local Mediterranean diet adaptation, making it challenging to determine sustained behavior changes over time. Additionally, because the data collected are cross-sectional, the generalizability of the findings may be limited, thus complicating the application of these results to other populations or settings beyond this study (Kirchhoff et al., 2022). Future research should consider longitudinal studies and broader demographic sampling to validate and expand upon these findings effectively.

Future studies should include long-term trials or randomized controlled designs to strengthen causal inferences, as well as qualitative explorations of traditional ecological knowledge and cultural food practices to enrich contextual understanding. Developing biology education curricula grounded in local food resources may further enhance community literacy, while scaling up the program's implementation across public health centers settings could broaden its public health impact. Overall, this study contributes to the fields of ethnobiology, maternal nutrition, and community biology education, underscoring the relevance of culturally grounded dietary approaches as effective strategies for public health interventions

CONCLUSION

This study demonstrates that local food–based Mediterranean-style nutrition education can improve dietary adherence, sleep quality, and psychological well-being among third-trimester pregnant women. The findings indicate that integrating locally available foods and culturally

familiar dietary practices into nutrition education can enhance the effectiveness and acceptability of dietary interventions during pregnancy. In addition, local food knowledge and culturally grounded dietary beliefs were positively associated with adherence to recommended dietary patterns, highlighting the importance of culturally relevant nutrition education in supporting maternal health behaviors.

These results suggest that culturally adapted nutrition education using local food resources can serve as an effective strategy for improving maternal dietary behavior and overall well-being. The integration of local food knowledge into maternal health education programs may strengthen dietary adherence and support sustainable nutrition practices. Future research should consider longer intervention periods and randomized controlled trial designs to confirm long-term effectiveness and strengthen causal inference. Overall, this study supports the application of culturally grounded, local food–based nutrition education as a promising approach to improving maternal nutrition and wellbeing in community health settings.

ACKNOWLEDGMENTS

The author extends sincere gratitude to the Ministry of Higher Education, Science, and Technology Indonesia (Kemdikdiksaintek) for providing financial support for this research. Appreciation is also expressed to the Institute for Research and Community Service (LPPM) and the Rector of Adiwangsa University Jambi for their continuous facilitation and institutional support. The author further acknowledges the dedication of the health workers and the participation of all respondents at the Pall Merah 2 and Kebun Kopi Community Health Center, whose contributions were essential to the completion of this study.

REFERENCE

Alharbi, F. (2025a). Traditional Place-Based Diets and Their Effects on Healthy and Sustainable Food Transitions: A Systematic Literature Review. *Public Health Nutrition*, 1–28. https://doi.org/10.1017/s1368980025101274

Alharbi, F. (2025b). Traditional Place-Based Diets and Their Effects on Healthy and Sustainable Food Transitions: A Systematic Literature Review. *Public Health Nutrition*, 1–28. https://doi.org/10.1017/s1368980025101274

Alrhmoun, M., Sulaiman, N., & Pieroni, A. (2025). Phylogenetic Perspectives and Ethnobotanical Insights on Wild Edible Plants of the Mediterranean, Middle East, and North Africa. *Foods*, *14*(3), 465. https://doi.org/10.3390/foods14030465

Arrivabene, A., Lasic, L., Blanco, J., Carrière, S. M., Ladio, A. H., Caillon, S., Porcher, V., & Teixidor-Toneu, I. (2024). Ethnobiology's Contributions to Sustainability Science. *Journal of Ethnobiology*, *44*(3), 207–220. https://doi.org/10.1177/02780771241261221

Austin, J. P. (2022). Traversing Academic Contexts: An Egyptian Writer's Literacy Learning Trajectory From Public School to Transnational University. *Written Communication*, *39*(4), 630–658. https://doi.org/10.1177/07410883221114085

Borelli, T., Hunter, D., Padulosi, S., Amaya, N., Meldrum, G., Oliveira, D. M. d., Samarasinghe, G., Wasike, V. W., Güner, B., Tan, A., Dembélé, Y. K., Lochetti, G., Sidibé, A., & Tartanac, F. (2020). Local Solutions for Sustainable Food Systems: The Contribution of Orphan Crops and Wild Edible Species. *Agronomy*, *10*(2), 231. https://doi.org/10.3390/agronomy10020231

Casas, I., Nakaki, A., Pascal, R., Castro-Barquero, S., Youssef, L., Genero, M., Benítez, L., Larroya, M., Boutet, M. L., Casu, G., Gomez-Gómez, À., Pozo, Ó. J., Morilla, I., Martínez-Arán, A., Vieta, E., Gómez-Roig, M. D., Casas, R., Estruch, R., Gratacós, E., … Crovetto, F. (2023). Effects of a Mediterranean Diet Intervention on Maternal Stress, Well-Being, and Sleep Quality Throughout Gestation—The IMPACT-BCN Trial. *Nutrients*, *15*(10), 2362. https://doi.org/10.3390/nu15102362

Chakrabarti, S., & Chakrabarti, A. (2019). Food Taboos in Pregnancy and Early Lactation Among Women Living in a Rural Area of West Bengal. *Journal of Family Medicine and Primary Care*, *8*(1), 86. https://doi.org/10.4103/jfmpc.jfmpc_53_17

Chan, K. M. A., Boyd, D. R., Gould, R. K., Jetzkowitz, J., Liu, J., Muraca, B., Naidoo, R., Olmsted, P., Satterfield, T., Selomane, O., Singh, G. G., Sumaila, R., Ngo, H. T., Boedhihartono, A. K., Agard, J., Aguiar, A. P., Armenteras, D., Balint, L., Barrington-Leigh, C., … Brondízio, E. S. (2020). Levers and Leverage Points for Pathways to Sustainability. *People and Nature*, *2*(3), 693–717. https://doi.org/10.1002/pan3.10124

Chandrasekara, R. P. N. P., & Jayasinghe, M. (2022). Nutrition Literacy for Human Health: A Review on Current Global and Sri Lankan Scenario. *Sljo-J-Vjs2*, *1*(2), 27–42. https://doi.org/10.4038/vjs.v1i2.11

Chowdhury, M., Raynes-Greenow, C., Kelly, P. J., Alam, A., Afsana, K., Billah, S. M., & Dibley, M. J. (2022). The Impact of Antenatal Balanced Plate Nutrition Education for Pregnant Women on Birth Weight: A Cluster Randomised Controlled Trial in Rural Bangladesh. *Nutrients*, *14*(21), 4687. https://doi.org/10.3390/nu14214687

Domínguez, P., Speciale, C., & Bentaleb, I. (2024). Introduction to the Research Collection "Mediterranean Biocultural Diversity." *Human Ecology*, *52*(2), 223–225. https://doi.org/10.1007/s10745-024-00508-2

Durazzo, A. (2019). The Close Linkage Between Nutrition and Environment Through Biodiversity and Sustainability: Local Foods, Traditional Recipes, and Sustainable Diets. *Sustainability*, *11*(10), 2876. https://doi.org/10.3390/su11102876

Fernández-Llamazares, Á., Lepofsky, D., Lertzman, K., Armstrong, C. G., Brondízio, E. S., Gavin, M. C., Lyver, P. O., Nicholas, G., Pascua, P., Reo, N. J., Reyes-García, V., Turner, N. J., Yletyinen, J., Anderson, E. N., Balée, W., Cariño, J., David-Chavez, D., Dunn, C., Garnett, S. C., … Vaughan, M. B. (2021). Scientists' Warning to Humanity on Threats to Indigenous and Local Knowledge Systems. *Journal of Ethnobiology*, *41*(2), 144–169. https://doi.org/10.2993/0278-0771-41.2.144

Godos, J., Ferri, R., Lanza, G., Caraci, F., Vistorte, A. O. R., Torres, V. Y., Grosso, G., & Castellano, S. (2024). Mediterranean Diet and Sleep Features: A Systematic Review of Current Evidence. *Nutrients*, *16*(2), 282. https://doi.org/10.3390/nu16020282

Haq, S. M., Pieroni, A., Bussmann, R. W., Abd-ElGawad, A. M., & Elansary, H. O. (2023). Integrating Traditional Ecological Knowledge Into Habitat Restoration: Implications for Meeting Forest Restoration Challenges. *Journal of Ethnobiology and Ethnomedicine*, *19*(1). https://doi.org/10.1186/s13002-023-00606-3

Hunter, D., Borelli, T., Oliveira, D. M. d., Oliveira, C. N. S., Coradin, L., Wasike, V. W., Wasilwa, L., Mwai, J., Manjella, A., Samarasinghe, G., Madhujith, T., Nadeeshani, H., Tan, A., Ay, S. T., Güzelsoy, N. A., Lauridsen, N., Gee, E., & Tartanac, F. (2019). The Potential of Neglected and Underutilized Species for Improving Diets and Nutrition. *Planta*, *250*(3), 709–729. https://doi.org/10.1007/s00425-019-03169-4

ISKANDAR, B. S., Iskandar, J., Mulyanto, D., & Aliifah, F. (2023). Local Knowledge of the Sundanese Community on Traditional Foods to Enhance the Family Food Security. *Etnosia Jurnal Etnografi Indonesia*, *8*(1), 76–89. https://doi.org/10.31947/etnosia.v8i1.24461

Kirchhoff, S., Dadaczynski, K., Pelikan, J. M., Zelinka-Roitner, I., Dietscher, C., Bittlingmayer, U. H., & Okan, O. (2022). Organizational Health Literacy in Schools: Concept Development for Health-Literate Schools. *International Journal of Environmental Research and Public Health*, *19*(14), 8795. https://doi.org/10.3390/ijerph19148795

Linderwell, S., Hargiss, C. L. M., & Norland, J. E. (2024). Do Demographic Factors Impact Plant Knowledge and Plant Awareness Disparity? *Journal of Natural Resources and Life Sciences Education*, *53*(1). https://doi.org/10.1002/nse2.20146

Mabhaudhi, T., Chimonyo, V. G. P., Hlahla, S., Massawe, F., Mayes, S., Nhamo, L., & Modi, A. T. (2019). Prospects of Orphan Crops in Climate Change. *Planta*, *250*(3), 695–708. https://doi.org/10.1007/s00425-019-03129-y

McNamara, K., & Wood, E. (2019). Food Taboos, Health Beliefs, and Gender: Understanding Household Food Choice and Nutrition in Rural Tajikistan. *Journal of Health Population and Nutrition*, *38*(1). https://doi.org/10.1186/s41043-019-0170-8

Medeiros, M. F. A. de, Silva, S. G. B., Teixeira, C. D., Lima, S. C. V. C., Marchioni, D. M. L., & Jacob, M. C. M. (2022). Assessment of Biodiversity in Food Consumption Studies: A Systematic Review. *Frontiers in Nutrition*, *9*. https://doi.org/10.3389/fnut.2022.832288

Mohammed, S. H., Hailu, T., Larijani, B., & Esmaillzadeh, A. (2019). Food Taboo Among Pregnant Ethiopian Women: Magnitude, Drivers, and Association With Anemia. *Nutrition Journal*, *18*(1). https://doi.org/10.1186/s12937-019-0444-4

Murakami, K., Shinozaki, N., Okuhara, T., McCaffrey, T. A., & Livingstone, M. B. E. (2024). Prevalence and Correlates of Dietary and Nutrition Information Seeking Through Various Web-Based and Offline Media Sources Among Japanese Adults: Web-Based Cross-Sectional Study. *Jmir Public Health and Surveillance*, *10*, e54805. https://doi.org/10.2196/54805

Niu, K., Liu, W., Xiao, Z., Ankang, W., Yang, T., Riondato, I., Ellwanger, A. L., Ang, A., Gamba, M., Yang, Y., & Giacoma, C. (2019). Exploring Local Perceptions of and Attitudes Toward Endangered François' Langurs (Trachypithecus Francoisi) in a Human-Modified Habitat. *International Journal of Primatology*, *40*(3), 331–355. https://doi.org/10.1007/s10764-019-00091-0

Pailaha, A. D. (2023). Public Health Nursing: Challenges and Innovations for Health Literacy in Rural Area. *Public Health Nursing*, *40*(5), 769–772. https://doi.org/10.1111/phn.13223

Rayna, S. E., Khan, F. A., Samin, S., Siraj, S., Nizam, S., Islam, S. S., & Khalequzzaman, M. (2024). *A Qualitative Study on Food Taboos Among Rural Pregnant Women in Bangladesh: Motivators for Adherence and Influencers of Taboo-Breaking Behavior*. https://doi.org/10.1101/2024.09.09.24313362

Rosas, R., Pimenta, F., Leal, I., & Schwarzer, R. (2019). FOODLIT-PRO: Food Literacy Domains, Influential Factors and Determinants—A Qualitative Study. *Nutrients*, *12*(1), 88. https://doi.org/10.3390/nu12010088

Saensouk, P., Saensouk, S., Boonma, T., Zhang, Y., Lv, L., & Jitpromma, T. (2025). Ethnobotanical Heritage of Edible Plants Species in Mueang District, Yasothon Province, Northeastern Thailand. *Biology*, *14*(9), 1264. https://doi.org/10.3390/biology14091264

Salamanca, P., Valls, R. M., Pedret-Figuerola, A., Sorlí-Aguilar, M., Santigosa-Ayala, A., Catalin, R.-E., Pallejà-Millán, M., Solà, R., & Martín-Luján, F. (2021). Effectiveness of a Motivational Nutritional Intervention Through Social Networks 2.0 to Increase Adherence to the Mediterranean Diet and Improve Lung Function in Active Smokers: The DIET Study, a Randomized, Controlled and Parallel Clinical Trial in Primary Care. *Nutrients*, *13*(10), 3597. https://doi.org/10.3390/nu13103597

Sidiq, F. F., Coles, D., Hubbard, C., Clark, B., & Frewer, L. J. (2022). Factors Influencing Consumption of Traditional Diets: Stakeholder Views Regarding Sago Consumption Among the Indigenous Peoples of West Papua. *Agriculture & Food Security*, *11*(1). https://doi.org/10.1186/s40066-022-00390-5

Stagg, B. C., & Dillon, J. (2022). Plant Awareness Is Linked to Plant Relevance: A Review of Educational and Ethnobiological Literature (1998–2020). *Plants People Planet*, *4*(6), 579–592. https://doi.org/10.1002/ppp3.10323

Sweileh, W. M. (2024). Mapping the Research Landscape On food and Nutritional Literacy: A bibliometric Analysis. *Health Education*, *125*(1), 34–48. https://doi.org/10.1108/he-03-2024-0043

Taylor, M. K., Sullivan, D. K., Ellerbeck, E. F., Gajewski, B. J., & Gibbs, H. (2019). Nutrition Literacy Predicts Adherence to Healthy/Unhealthy Diet Patterns in Adults With a Nutrition-Related Chronic Condition. *Public Health Nutrition*, *22*(12), 2157–2169. https://doi.org/10.1017/s1368980019001289

Tremblay, R., Landry-Cuerrier, M., & Humphries, M. M. (2020). Culture and the Social-Ecology of Local Food Use by Indigenous Communities in Northern North America. *Ecology and Society*, *25*(2). https://doi.org/10.5751/es-11542-250208

Tsegaye, D., Tamiru, D., & Belachew, T. (2020). *Food Related Taboos and Misconceptions During Pregnancy Among Rural Communities of Illu Aba Bor Zone, Southwest Ethiopia*. https://doi.org/10.21203/rs.3.rs-33789/v1

Tsegaye, D., Tamiru, D., & Belachew, T. (2021). Food-Related Taboos and Misconceptions During Pregnancy Among Rural Communities of Illu Aba Bor Zone, Southwest Ethiopia. A Community Based Qualitative Cross-Sectional Study. *BMC Pregnancy and Childbirth*, *21*(1). https://doi.org/10.1186/s12884-021-03778-6

Ünal, G., & Özenoğlu, A. (2024). Association of Mediterranean Diet With Sleep Quality, Depression, Anxiety, Stress, and Body Mass Index in University Students: A Cross-Sectional Study. *Nutrition and Health*, *31*(2), 659–666. https://doi.org/10.1177/02601060231207666

Vayona, A., Discetti, R., Appleton, K. M., Bray, J., Hartwell, H., & Britton, J. R. (2025). What Do Stakeholders Understand of the Links Between Diet and Terrestrial Biodiversity Loss? A Systematic Review of the Literature. *People and Nature*, *7*(8), 1796–1810. https://doi.org/10.1002/pan3.70093

Woodmansee, A. (2022). Maize Landraces and Drought: Seed Systems in San Miguel Del Valle, Oaxaca, Mexico. *Journal of Ethnobiology*, *42*(4), 477–494. https://doi.org/10.2993/0278-0771-42.4.477