

# Effectiveness of the GADHIES model in improving midwife health promotion skills

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**Abstract.** *Background and aim of the work:* Health education is a process that transforms behaviors, attitudes, and knowledge for specific health outcomes. This study aims to 1) Identify key characteristics of the GADHIES-based health education model that improve midwives' competencies in health promotion; 2) Develop this model to enhance these competencies; 3) Evaluate the effectiveness of the model's implementation in improving midwives' competencies. *Methods:* This study uses the Research and Development model and involves 66 village midwives across Langsa's health centers. Data collection included observations, interviews, documentation, questionnaires, and assessments. Research instruments and model design were validated by experts and trialed with midwives for feasibility and effectiveness. Trials occurred in two phases: a limited trial with 22 respondents and an extensive trial with 44 respondents. *Results:* The study's findings indicate: 1) Village midwives identify critical characteristics of the GADHIES health education management model—empowerment, a behavioral science approach, precise purposes, result-oriented analysis, holistic perspective, and supportive tools—that enhance health promotion competencies; 2) The GADHIES model is valid and feasible for improving midwives' health promotion competencies in Langsa, with expert validation at 88.5% and user feasibility at 91.8%; and 3) The model effectively improves midwives' competencies in health promotion in Langsa, supported by paired sample t-test results and average normalized gain (N-Gain) scores of 0.86 and 0.68 from two trials. *Conclusions:* The GADHIES health education management model has demonstrated significant efficacy in augmenting midwives' skills and competencies in health promotion. This effect has been particularly pronounced in Langsa, an Aceh Province city in Indonesia. Through the application of this model, midwives are increasingly proficient in providing comprehensive health education, consequently facilitating improved health outcomes in the community. ([www.actabiomedica.it](http://www.actabiomedica.it))

**Key words:** effectiveness, feasibility, gadhies model, health promotion, midwife competency, model development, midwifery education, maternal health, preventive care

## Introduction

Health education systematically modifies behaviors, attitudes, and knowledge to achieve health objectives. It represents a dynamic process where individuals may accept or reject information health professionals provide. Effective health education targets

transformative changes in cognitive frameworks and behaviors, addressing various health issues, enhancing medical therapies, disease prevention, and promoting healthy behaviors (1). Clean and Healthy Living Behavior/Perilaku Hidup Bersih dan Sehat (PHBS) and environmental factors are significant health determinants in Indonesia. This paradigm emphasizes personal

hygiene (2), appropriate attitudes toward diseases, and proactive health responses (3). Launched in 2011 by the Health Promotion Center, PHBS comprises ten criteria, including assisted childbirth by qualified professionals; routine infant weighing; exclusive breastfeeding; access to clean water; handwashing with soap (2); prevention of mosquito breeding; use of sanitary latrines; daily fruit and vegetable consumption; regular physical activity; and no smoking indoors. Poor adherence to PHBS can lead to adverse health outcomes for families (4). The Basic Health Research (Riskesdas), conducted in 2007, 2013, and 2018, indicates a 28% increase over the decade in households adopting Health Behavior Indicators, showing that households practicing PHBS rose from 11.2% in 2007 to 39.1% in 2018. In 2013, twelve provinces surpassed the national average, while twenty-one were below it. Overall, individuals with good PHBS reached 41.3%, with the highest percentages in Bali (59.2%), DKI Jakarta (55.2%), and DI Yogyakarta (51.9%). In stark contrast, the lowest was reported in Papua (21.7%) and East Nusa Tenggara (24.4%) (5). Despite the increasing percentages, healthcare professionals often struggle to identify health intervention needs until individuals become ill. Although healthcare providers strive to enhance awareness through counseling and home visits, many remain unaware of the importance of health (6). While initiatives for promoting PHBS mobilize essential resources, substantial changes in healthy living behavior have yet to materialize, as documented by persistent indicators failing to meet established benchmarks. The PRECEDE-PROCEED model serves as a critical public health framework, facilitating the identification of intervention targets while integrating individual and environmental factors to enhance the effectiveness of health programs (7,8). This model enables educators to evaluate public health concerns with stakeholders' involvement by applying established theories and tailoring educational initiatives to specific health behavior predictors (8,9). A December 2022 study involving midwives from Langsa village identified significant gaps in community health education, highlighting a widespread lack of awareness among residents regarding health behaviors. Despite health workers' efforts to

promote health education (10), community members often receive information passively, without practical application in their daily lives. Most initiatives led by village midwives rely on lecture-based methods that do not adequately address the community's unique needs, often limited by predetermined programs and funding. Passive educational materials, such as brochures and posters, have proven insufficient without comprehensive planning and strategic alignment (7). Consequently, community empowerment needs to be stronger, hindering practical social support and advocacy efforts and leaving improvements in health behaviors largely unfulfilled (11). Jones and Donovan (12) have demonstrated that the PRECEDE-PROCEED model significantly supports planning community empowerment programs in health. Green (13) emphasizes that this model is rooted in community needs assessments to change behaviors. Nonetheless, Ashwell and Barclay argue that the model falls short in identifying inhibiting factors during assessments, recommending the addition of a step in Phase Three to uncover these barriers, consequently enhancing risk management right from the program's inception (14). Moreover, The Health Belief Model (HBM) offers insight into health-related behaviors based on individuals' attitudes and beliefs, suggesting that perceptions of disease severity and prevention strategies influence health behaviors. Utilizing frameworks such as stimulus-response and cognitive theories, HBM is crucial in analyzing health behaviors and informing health promotion initiatives (15,16). Studies indicate that perceived vulnerability, benefits, and barriers correlate positively with the likelihood of engaging in health-promoting behaviors, although perceived severity seems less impactful. Optimal benefits from the HBM could be attained by integrating models that consider contextual factors and strategies for behavior change (17). By inspiring the PRECEDE-PROCEED model and the HBM, the GADHIES Health Education Model integrates systematic procedural steps for community engagement, stakeholder involvement, goal setting, and barrier identification. Considering the limitations of existing models, the proposed synthesis aims to enhance midwives' health promotion competencies, thereby

establishing a benchmark for excellence in midwifery practices. This newly proposed Health Education Management Model embodies the elements of Goals, Assessment, Diagnosis, Health Program, Implementation, and Evaluation System.

## Methods

### *Study design and setting*

This study employs a rigorous Research and Development (R&D) framework to enhance health services within the designated region. The research will be conducted in Langsa, situated in the Aceh province of Indonesia, targeting five selective health centers under the purview of the Langsa Health Office. These centers have been deliberately chosen due to their strategic significance in delivering healthcare services to the local population. The timeline for the research is delineated from May to August 2024, encompassing various methodological phases, including data collection, analytical processes, and the implementation of developmental strategies intended to improve health outcomes within these facilities. Additionally, the R&D initiatives will collaborate with local health authorities to ensure that the interventions are congruent with community health needs and established health policies.

### *Study population and sampling*

This study encompasses a cohort of 66 village midwives currently engaged in professional practice within the jurisdiction of the Langsa Health Office. These practitioners are strategically distributed across five health centers within the region, ensuring a diverse representation of the practices and experiences of village midwives. The primary focus of this research is the GADHIES (Goals, Assessment, Diagnostic, Health Program, Implementation, and Evaluation) management model. This health education management framework is designed to enhance midwives' professional competencies in health promotion. The study aims to critically analyze the implementation and efficacy of the GADHIES model to ascertain its

impact on midwives' skills and knowledge base, particularly within the context of Langsa, Aceh Province, Indonesia.

### *Data collection and questionnaire*

The research conducted on the formulation of a GADHIES-based health education management model employs various data collection methodologies, including (1) observational data collection and interviews with village midwives, (2) assessments of model feasibility conducted by experts, practitioners, and users utilizing questionnaire instruments designed to gauge the feedback of village midwives regarding assessment questionnaires, and (3) pretest and post-test evaluations aimed at determining the competencies of midwives in health promotion and counseling through a scientifically developed model utilizing competency observation instruments. The instruments utilized in the R&D of the model for health education management follow a multi-stage research design, necessitating that researchers undertake at least three distinct types of research within a single research cycle. Researchers employ several instruments according to the various stages of their investigation.

- a. Analysis Stage: The tools employed by the researcher encompass questionnaires, interviews, and various forms of documentation.
- b. Design Stage: This stage involves formulating the product concept. The GADHIES health education model integrates the PRECEDE-PROCEED model and the HBM, culminating in creating a novel health education framework designated by GADHIES.
- c. Conceptual Model Development Stage: Researchers must navigate multiple phases in formulating a conceptual model, including model development and subsequent validation.
- d. Model Implementation Stage: During the implementation phase, the researcher devises various instruments to assess the experimental activities' process and outcomes.
- e. Model Evaluation Stage: The researcher utilized a quantitative questionnaire in the evaluative

process. Furthermore, the review of results, particularly concerning assessing the model's efficacy, relied chiefly on the deployment of a questionnaire as the evaluative instrument.

### Data analysis

Quantitative data analysis involves multiple methodologies to ensure comprehensive insights. Key types of analyses include:

- a. **Validity Analysis:** This checks whether the data collection instruments accurately measure what they intend to measure, ensuring that the conclusions drawn from the data are sound.
- b. **Feasibility Analysis:** This assesses the practicality of implementing health promotion strategies based on the data, evaluating whether the proposed solutions can be executed effectively given the available resources.
- c. **Assessment of Health Promotion Competencies:** This evaluation focuses on specific competencies required for effective health promotion and determines how well these competencies are being implemented in practice.
- d. **Effectiveness Testing:** This comprises rigorous statistical tests to evaluate the impact of health promotion interventions (18,19), which include:
  1. **Normality Test:** This assesses whether the data follows a normal distribution, which is essential for determining the appropriate statistical methods to apply.
  2. **Homogeneity Test:** This ensures that the variances among different groups are similar, which is crucial for specific statistical analyses.
  3. **t-test:** A statistical test used to compare the means between two groups, helping to determine if there is a significant difference between them.
  4. **N-Gain Test:** This evaluates the effectiveness of interventions by measuring the improvement in performance before and after the intervention, providing insight into the overall impact of health promotion efforts.

## Results

### *Characteristics of the GADHIES health education management model*

#### ANALYSIS STAGE

1. **Needs Analysis:** The assessment of model needs analysis activities was conducted employing observational methods and interviews, grounded in empirical phenomena within the field, alongside data meticulously gathered by researchers. The findings indicate the following: The coverage of PHBS under the responsibility of village midwives has not met expected targets; The proficiency of midwives in health promotion and counseling must be improved; The extant Health Education model has proven ineffective in facilitating the anticipated behavioral changes among the populace. Consequently, the researcher is interested in developing a health education model to enhance midwives' health promotion and counseling competencies grounded in the GADHIES framework. This model aims to bolster village midwives' capabilities in executing their health promotion and counseling responsibilities. Furthermore, the GADHIES model is anticipated to aid governmental efforts in increasing PHBS coverage in Langsa, fostering positive behavioral changes within the community to achieve optimal health outcomes.
2. **Analysis of GADHIES Variables and Health Promotion and Counseling Competencies:** The outcomes derived from the analysis examining the interrelation between these two variables are presented in Table 1 below:
3. **Analysis of Respondent Characteristics:** The ensuing discussion presents the findings derived from examining the demographic and behavioral attributes of the respondents participating in this study.

Table 2 illustrates that the predominant age group among village midwife respondents is between 26 and

**Table 1.** Results of Analysis of the Relationship between GADHIES Variables and Midwifery Competence in Health Promotion and Counseling

Variable	Health Promotion and Counseling Competencies		$X^2$	P	RP	95% CI
	Competent (%)	Incompetent (%)				
<b>Goals</b>						
Good	20 (100)	1 (50)	10.47	0.001	0.05	0.007-0.322
Not Good	0 (0)	1 (50)				
<b>Assessment</b>						
Good	19 (95)	1 (50)	4.46	0.035	19	0.619-583.4
Not Good	1 (5)	1 (50)				
<b>Diagnostic</b>						
Good	20 (100)	1 (50)	10.47	0.001	0.05	0.007-0.322
Not Good	0 (0)	1 (50)				
<b>Health Program</b>						
Good	19 (95)	1 (50)	4.46	0.035	19	0.619-583.4
Not Good	1 (5)	1 (50)				
<b>Implementation</b>						
Good	19 (95)	0 (0)	13.93	0.01	3	0.606-14.86
Not Good	1 (5)	2 (100)				
<b>Evaluation System</b>						
Good	17 (85)	0 (0)	7.48	0.006	1.67	0.82-3.41
Not Good	3 (15)	2 (100)				

Note : n = 22; Abbreviations: P = p-value;  $X^2$  = Chi-Square; CI= Confidence Interval; RP = Ratio Prevalence; \* = significance

**Table 2.** Characteristics of Research Respondents (n = 66)

Characteristic	Frequency	Percentage
<b>Age</b>		
21 – 25	3	4.6
26 – 35	33	50
36 – 45	27	40.9
46 – 55	1	1.5
<b>Employment</b>		
Civil Employee	43	65.1
Non Civil Employee	23	34.9
<b>Working Period</b>		
< 5 Years	3	4.5
5–10 Years	15	22.8
11–20 Years	47	71.2
> 20 Years	1	1.5

35 years, comprising 33 individuals, which accounts for 50% of the sample. Regarding occupational characteristics, civil servant village midwives emerged as the largest group, totaling 43 respondents, representing 65.1% of the population. Furthermore, concerning the

length of service, village midwives with 11-20 years of experience constituted the majority, totaling 47 individuals and accounting for 71.2% of respondents.

#### DESIGN STAGE

The health education management model proposed by GADHIES exhibits the following characteristics:

1. Empowerment: A crucial principle of GADHIES is empowering communities in health promotion. This involves active community engagement at every stage, leading to more sustainable health outcomes (11).
2. Behavioral Science Approach: Using a behavioral science framework, GADHIES synthesizes psychology and social science concepts to analyze and influence health behaviors. Behavior change theories like the HBM and Theory of Planned Behavior systematically

clarify the factors that promote or hinder health behaviors (20).

3. **Purposed:** By prioritizing midwives' comprehension, GADHIES guarantees that health education initiatives are congruent with their particular needs and responsibilities, thereby enhancing the efficacy of their implementation.
4. **Result and analysis:** The GADHIES model uses a results-oriented, needs-based approach to evaluate midwives' competencies and identify areas for improvement. This aligns with established health education needs assessment frameworks, prioritizing interventions based on empirical evidence. By focusing on competency-based outcomes, the model ensures that midwives are well-prepared to deliver effective health education (21).
5. **Holistic:** GADHIES highlights a holistic approach to health promotion, stressing the connections between physical, psychological, and social health as essential for overall well-being. Holistic health education takes a comprehensive view, focusing on the individual instead of isolated issues. This aligns with integrative health models advocating for multifaceted healthcare strategies. Such perspectives ensure that health promotion initiatives are multidimensional and meet community health needs (22).
6. **Tools support:** Effective health education models require pragmatic tools for better implementation. The GADHIES model includes structured instruments such as handbooks and standard operational procedures (SOPs), creating a cohesive framework that standardizes implementation. These educational resources are vital for consistency and adherence to evidence-based practices in community health settings (23).

## CONCEPTUAL MODEL DEVELOPMENT

Developing a conceptual framework, such as the GADHIES Health Education Model, necessitates a series of critical stages, namely model development and validation. Walker and Avant elucidate that model development encompasses multiple phases, beginning with identifying the problem, articulating the model's purpose, and selecting relevant theoretical foundations and constructs. These elements must be cohesively aligned with the desired outcomes (24). Moreover, model validation must be considered, which must entail the verification of both internal consistency—assessing the model's coherence and functionality within its framework—and external validity—evaluating its applicability beyond the original research context. They advocate for a systematic methodology that includes empirical testing of the model, iterative revisions informed by feedback, and ongoing refinement of the framework (25). During this phase, researchers validate through expert assessments and user trials. The results from these tests are systematically presented in Tables 3 and 4 below.

Following the evaluation conducted by the material expert, a cumulative score of 186 was achieved, in contrast to the anticipated score of 210, calculated as 21 multiplied by 5 and then by 2. Consequently, the feasibility percentage of the model was computed utilizing the formula for feasibility percentage (19):

$$\begin{aligned} \text{Elibility percentage} &= \frac{\text{Score obtained}}{\text{Expected Score}} \square 100\% \\ &= \frac{186}{210} \square 100\% = 88.5\% \end{aligned}$$

**Table 3.** Expert Validation

No	Validator	Assessed Aspects					Sum
		<i>Self Instructional</i>	<i>Self Contained</i>	<i>Independent</i>	<i>Self Assesed</i>	<i>User Friendly</i>	
1.	Expert 1	29	25	19	14	15	102
2.	Expert 2	24	20	16	12	12	84
Total		54	47	35	28	30	186

**Table 4.** Mean Validation of Expert Assessments

No	Aspect	Average Percentage	Category
1.	Self-instructional	88.3	Highly Worthy
2.	Self-contained	90	Highly Worthy
3.	Independent	87.5	Highly Worthy
4.	Self-assessed	86.7	Highly Worthy
5.	User friendly	90	Highly Worthy
Average Total		88.5	Highly Worthy

Consequently, in light of the findings from the expert validation, it can be inferred that the GADHIES health education model significantly enhances midwives' competencies in health promotion and counseling within Langsa, indicating a high level of feasibility (Table 4).

The feasibility assessment of the GADHIES health education model (Table 5), implemented by village midwives, was analyzed across five dimensions: relative excellence, compatibility/suitability, complexity, observable ability, and testable aspects. The findings indicated that, based on the aggregated metrics, the model's average feasibility score reached 91.8%, categorizing it as "very feasible."

#### MODEL IMPLEMENTATION AND EVALUATION: EFFECTIVENESS OF GADHIES HEALTH EDUCATION MANAGEMENT MODEL

1. Implementation Stage
2. The workshop lasted a full day, specifically from 08.00 to 17.00 WIB. This event saw enthusiastic participation from 44 dedicated village midwives and prominent figures such as the Head of the Langsa City Health Office, the head of the local Health Center, and the Coordinator Midwife. Additionally, several resource persons and midwifery education practitioners from the Langsa area contributed their insights. The workshop

**Table 5.** Recapitulation of User Response Results

No	Aspect	Average Percentage	Category
1.	Relative advantages	94	Highly Worthy
2.	Compatibility/fit	93	Highly Worthy
3.	Complexity level	89	Highly Worthy
4.	Observability	91	Highly Worthy
5.	Testable capabilities	92	Highly Worthy
Average Total		91.8	Highly Worthy

**Table 6.** Completeness of Pretest and Post-test Results of Limited Trial

No	Test	Health Promotion and Counseling Competencies					
		Competent			Incompetent		
		F	%	Criteria	f	%	Criteria
1	<i>Pretest</i>	2	9.1	Very Low	20	90.9	Very High
2	<i>Posttest</i>	20	86.4	Very High	2	9.1	Very Low

was convened at the spacious and well-equipped Health Center Hall in Langsa Lama, which provided an ideal setting for discussions and collaborative learning.

#### 3. Evaluation Stage

#### LIMITED TRIAL

According to the data presented in Table 6, the sample consisted of 22 village midwife respondents. Initially, the pretest results indicated that only two respondents (9.1%) demonstrated competency, reflecting a notably low level of proficiency. Conversely, the majority, comprising 20 respondents (90.9%), were classified as incompetent, indicating a substantial skill deficiency at that stage. Following the intervention, the post-test results revealed a remarkable improvement: the number

**Table 7.** Normality Test Results

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Health Promotion	.161	22	.142	.935	22	.156
Posttest Health promotion	.138	22	.200*	.916	22	.064

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

**Table 8.** Homogeneity Test Results

		Levene Statistic	df1	df2	Sig.
Result Pretest & Post-test	Based on Mean	1.757	1	42	.192
	Based on Median	1.112	1	42	.298
	Based on Median and with adjusted df	1.112	1	28.143	.301
	Based on trimmed mean	1.418	1	42	.240

of competent village midwife respondents increased to 20 (90.9%), while the count of incompetent respondents decreased to just two individuals (9.1%). This data underscores a significant enhancement in the competence of midwives, with an increase from two (9.1%) in the pretest to twenty (90.9%) in the post-test.

The results of the normality test, conducted using the Shapiro-Wilk method, indicate a significance value ( $p$ ) of 0.156 ( $p > 0.05$ ) for the pretest data and a significance value ( $p$ ) of 0.064 ( $p > 0.05$ ) for the post-test data. Given that both tests yield  $p$ -values exceeding 0.05, we can infer that the village midwives' pretest and post-test results from the limited trial conform to a normal distribution per the decision criteria established for the Shapiro-Wilk normality test (Table 7).

The results in Table 8 illustrate the outcomes of the homogeneity of variances test. The significance values (Sig.) for the pretest and post-test variables are reported as 0.192 and 0.298, respectively, both

**Table 9.** Descriptive data paired sample t-test

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest Limited Trial	18.77	22	3.558	.759
	Posttest Limited Trial	33.86	22	1.833	.391

exceeding the threshold of 0.05. Consequently, based on the aforementioned significant outcomes, we can infer that the variances of the pretest and post-test data from the limited trial exhibit homogeneity.

#### PAIRED SAMPLE T-TEST

Table 9 presents a comprehensive summary of the descriptive statistical findings from the limited trial encompassing both the pretest and post-test evaluations. A total of 22 village midwife respondents participated in the study. The mean score from the pretest assessment was calculated to be 18.77, whereas the mean score for the post-test assessment significantly increased to 33.86. The standard deviation for the pretest scores was determined to be 3.558, while the post-test scores exhibited a standard deviation of 1.833. Additionally, the average standard error for the pretest was measured at 0.759, in contrast to an average standard error of 0.391 for the post-test.

Analysis of the results presented in Table 10 indicates that the significance level (two-tailed) is less than 0.05. Consequently, adhering to the decision-making criteria established for the paired sample t-test, the null hypothesis ( $H_0$ ) is rejected. This leads to the conclusion that a statistically significant average difference exists between the pretest and post-test scores. Therefore, it can be inferred that implementing the GADHIES health education model effectively enhances midwives' competencies in health promotion and counseling within the context of Langsa.

#### EXTENSIVE TRIAL

Table 11 presents the findings regarding the competency levels of midwives conducting health



**Table 10.** Significance (2-tailed) Paired sample t-test

Paired Samples Test										
		Paired Differences					T	df	Sig. (2-tailed)	
		Mean	SD	SE Mean	95% CI					
					Lower	Upper				
Pair 1	Pretest Limited Trial - Post-test Limited Trial	-15.091	4.058	.865	-16.890	-13.292	-17.443	21	.000	

**Table 11.** Completeness of Pretest and Post-test Results

No	Test	Competent			Incompetent		
		F	%	Criteria	f	%	Criteria
1.	Pretest	3	6.8	Very Low	41	93.2	Very High
2.	Post-test	42	95.5	Very High	2	4.5	Very Low

promotion and counseling. At the pretest stage, only three midwives (6.8%) demonstrated competency according to the established criteria, indicating a significantly low level of qualifications. Conversely, 41 midwives (93.2%) were classified as incompetent, reflecting a substantially high degree of inadequacy in their qualifications. Following the implementation of the GADHIES Health Education Model, a marked improvement was observed in the competency of midwives by the post-test phase. The number of competent midwives increased to 42 individuals (95.5%), signifying a transition to a very high competency threshold. Concurrently, the number of incompetent midwives decreased substantially to 2 individuals (4.5%), indicating a very low competency status shift.

In summary, there was a notable increase in the percentage of competent midwives from 6.8% in the pretest to 95.5% in the post-test. Likewise, the percentage of incompetent midwives experienced a significant reduction from 93.2% in the pretest to 4.5% in the post-test, reflecting the effectiveness of the implemented educational intervention.

According to the data presented in Table 12, the sample comprised 44 village midwife respondents. The pretest scores ranged from a minimum of 19 to a maximum of 29. After implementing the GADHIES Health Education model, the post-test scores improved, with a minimum score of 28 and a maximum score of 36.

**Table 12.** Test Table of Pretest and Post-test values

		Pretest Health Promotion	Postest Health Promotion
N	Valid	44	44
	Missing	0	0
Mean		24.00	32.30
Std. Error of Mean		.385	.334
Std. Deviation		2.552	2.216
Minimum		19	28
Maximum		29	36

The mean score significantly increased, ascending from 24.00 in the pretest to 32.30 in the post-test assessment. Furthermore, the standard deviation decreased from 2.552 in the pretest to 2.216 in the post-test, which suggests a reduction in the variability of the scores. A lower standard deviation indicates that the scores are closely clustered around the mean, while a higher standard deviation reflects a broader dispersion of values.

According to the results of the normality test, the significance values ( $p$ ) for the pretest and post-test of the village midwives were 0.071 ( $p > 0.05$ ) and 0.083 ( $p > 0.05$ ), respectively (Table 13). Since both significance values exceed 0.05, it can be concluded that the pretest and post-test data from the extensive trial are normally distributed among the village midwives.

The results from the homogeneity of variances test presented in Table 14 indicate a significance value (Sig.) of 0.446, which exceeds the threshold of 0.05. Accordingly, based on the established criteria for decision-making regarding homogeneity, one can conclude that the variance of the pretest and post-test results from the broad trial is consistent, demonstrating homogeneity.

**Table 13.** Normality Test Results

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Pretest Health Promotion	.114	44	.184	.953	44	.071
Posttest Health Promotion	.116	44	.160	.955	44	.083

a. Lilliefors Significance Correction

**Table 14.** Homogeneity Test Results

		Levene Statistic	df1	df2	Sig.
Health Promotion & Counseling Extensive test	Based on Mean	.585	1	86	.446
	Based on Median	.699	1	86	.405
	Based on Median and with adjusted df	.699	1	84.471	.405
	Based on trimmed mean	.590	1	86	.445

The data indicates that the average score of the pretest (24) is significantly lower than that of the post-test (32.3), highlighting a noteworthy difference in the average test results between the two assessments. To ascertain whether implementing the GADHIES model enhances midwives' competencies in health promotion and counseling within Langsa, please refer to Table 15 for detailed insights.

*Significance paired sample test*

If the p-value for the Significance (2-tailed) test is less than 0.05, the null hypothesis (H0) is rejected. This finding indicates that implementing the GADHIES health education model significantly enhances midwives' competency in health promotion and counseling within the Langsa region.

According to the findings presented in Table 16, a significance level (Sig. 2-tailed) of less than 0.05

**Table 15.** Descriptive data paired sample t-test

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest Extensive test	24.00	44	2.552	.385
	Posttest Extensive test	32.30	44	2.216	.334

indicates that the null hypothesis (H0) can be rejected under the decision-making criteria established for the paired sample t-test. Consequently, it is accepted that the alternative hypothesis (Ha) holds. This leads to the conclusion that a statistically significant average difference exists between the pretest and post-test results. Therefore, it can be inferred that implementing the GADHIES health education model positively enhances midwives' competencies in health promotion and counseling within the Langsa region.

*Effectiveness test (N Gain Score)*

According to the findings presented in Table 17, the sample for this study consisted of 22 village midwives. None of the participating midwives achieved a low category gain value (score < 0.3). In contrast, 20 midwives (90.9%) attained a high category gain value (score > 0.7), while two midwives (9.1%) demonstrated a medium category gain value (0.3 ≤ g ≤ 0.7).

According to the findings presented in Table 18, the sample for the extensive test comprised 44 village midwives. Two village midwives, representing 4.5% of the sample, exhibited low category gain values (N-Gain Score < 0.3). In contrast, 22 midwives, accounting for 50%, achieved high category gain values (N-Gain Score > 0.7). Furthermore, 20 midwives, or 45.5%, attained medium category gain values (0.3 ≤ N-Gain Score ≤ 0.7). The average N-Gain Scores (g) observed across the two trials were 0.86 and 0.68. Given that the N-Gain Score exceeds the threshold of 0.7, which classifies the result as high, it can be inferred that the GADHIES health education model effectively enhances midwives' health promotion and counseling competencies in Langsa.

**Table 16.** Significance (2-tailed) Paired Sample t Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	SD	SE Mean	95% CI of the Difference				
					Lower	Upper			
Pair 1	Pretest Extensive test - Posttest Extensive test	-8.295	3.115	.470	-9.242	-7.348	-17.666	43	.000

**Table 17.** N-Gain Distribution Limited trial

Interval	Limited trial		
	f	Percentage (%)	Cumulative Presentation (%)
High ( $g > 0.7$ )	20	90.9	90.9
Moderate ( $0.3 \geq g \leq 0.7$ )	2	9.1	100
Low ( $g < 0.3$ )	0	0	100
Total	22	100	-

**Table 18.** N-Gain distribution Extensive trial

Interval	Extensive trial		
	f	Percentage (%)	Cumulative Presentation (%)
High ( $g > 0.7$ )	22	50	50
Moderate ( $0.3 \geq g \leq 0.7$ )	20	45.5	95.5
Low ( $g < 0.3$ )	2	4.5	100
Total	44	100	-

## Conclusions

The analysis conducted during the design phase indicates that the health education management model necessary for village midwives in Langsa to improve their health promotion and counseling competencies is the GADHIES health education model. Several key features characterize this model: First, Empowerment: The GADHIES model underscores the importance of community engagement at every stage of health promotion. It fosters a sense of accountability within the community for behavioral change, highlighting the need for a participatory approach to public health strategies (26,27). Second is the Behavioral Science

Approach: Incorporating a behavioral science framework within this model aims to influence public and individual perceptions and beliefs regarding health. This framework aligns with the principles outlined by Ajzen (28), which emphasize the role of attitudes in behavior change, thus enhancing the model's effectiveness in a health context (26,27).

Third is Purposefulness: The model is meticulously designed to elevate village midwives' understanding of health education through a systematic process that incorporates goal setting, needs assessment, diagnosis, design of health programs, implementation, and subsequent evaluation of outcomes (29). This systematic approach ensures that the interventions are relevant and strategically aimed at community needs. The fourth is Data-Informed Needs Assessment: The findings underscore the necessity of enhancing health promotion and counseling competencies based on quantitative data collection methods. This includes a focus on three critical issues: The coverage of PHBS under the responsibility of village midwives has yet to meet established benchmarks (30); The competency levels of village midwives in health promotion and counseling require significant improvement; and The existing health education models have not effectively fostered the necessary changes in community health behaviors (31,32). Next is the Holistic Approach: The GADHIES model promotes holistic and integrative concepts in health education implementation, aligning with health as a multifaceted issue requiring comprehensive solutions (31,32). Finally, it is a Supportive Tool: This model provides various supporting instruments, including handbooks and SOP, to facilitate the effective implementation of the GADHIES model, enhancing its usability and accessibility for village midwives (31). The implications of this study are corroborated by the findings of Joyce and Allyn (33), who assert that any effective teaching and

learning model must encompass not only clearly defined objectives and underlying assumptions but also five crucial elements of model characteristics: syntax, social system, reaction principle, support system, and instructional impact (32). The feasibility of the GADHIES health education management model was rigorously assessed through expert validation involving practitioners in health management and promotion. Insights from this validation process reveal that the GADHIES model demonstrates a high feasibility level (32,34). Validation procedures employed quantitative methods. Data collected from expert evaluations and trials by users confirm that the GADHIES health education model is both valid and practical for implementation (35). The expert validation examined the model across five dimensions: self-instructional, self-contained, independent, self-assessed, and user-friendly. The material feasibility score attained was an impressive 88.5%, indicating a classification of 'very feasible.' User assessments of the model's feasibility were subsequently analyzed based on several criteria, including relative advantage, compatibility, complexity, observability, and testability. The average feasibility score across these aspects was recorded at 91.8%, also categorized as 'very feasible.' The concept of relative advantage highlights the model's superiority over prior frameworks by establishing distinct and quantifiable stages, which facilitates the identification of areas requiring improvement to enhance effectiveness (35,36). Furthermore, the GADHIES health education model integrates elements from two established frameworks—the PRECEDE-PROCEED model and the HBM—while incorporating principles of systems management theory (13). This development is anticipated to sustainably engage the community in efforts to transform health behaviors, ultimately leading to improved health promotion and counseling outcomes (7). The GADHIES health education management model is remarkably effective in enhancing the competence of village midwives in health promotion and counseling. This effectiveness is evidenced by the statistical outcomes observed in a paired sample t-test conducted across two trials and the analysis of the average N-Gain scores. Specifically, the significance value (Sig. 2-tailed) from the second trial was less than 0.05, leading to the rejection of the null hypothesis

(Ho). This outcome indicates that applying the GADHIES model significantly improved midwives' competencies in Langsa, emphasizing its potential as a transformative educational framework (31,37).

In quantifying the improvements, the average N-Gain scores from the two trials were recorded at 0.86 and 0.68, respectively. Given that an N-Gain score more excellent than 0.7 falls into what is classified as a high category, it can be conclusively argued that the GADHIES health education model is instrumental in elevating the competency levels of midwives, particularly in health promotion and counseling initiatives (21,27). The model's structure is characterized by distinct stages: analysis, design, development, implementation, and evaluation (24). Each stage is meticulously designed to facilitate a comprehensive approach to health education management, incorporating goals, assessments, diagnostics, health program frameworks, implementation strategies, and evaluation systems vital for improving midwives' competencies in Langsa (24,25). In conclusion, the GADHIES health education management model demonstrates a valid and feasible approach to enhancing the competencies of midwives involved in health promotion in Langsa. This assertion of feasibility is substantiated through meticulous expert validation and user testing, yielding a remarkable expert validation score of 88.5% and a user feasibility score of 91.8%, both categorized as 'very feasible.' These findings, in conjunction with the statistical evidence presented, underscore the critical role of the GADHIES health education management model in fostering the competencies necessary for effective health promotion practices among midwives in Aceh Province, Indonesia (38,39). Moreover, the overall effectiveness of the GADHIES health education model remains consistently validated across trials. The statistical significance in the paired sample t-test and N-Gain analyses reiterates its applicability as a robust educational strategy. Accepting the alternative hypothesis (Ha) reinforces the notion that implementing the GADHIES model is essential for enhancing the competencies of midwives engaging in health promotion initiatives in Langsa, Aceh Province, Indonesia (9,13). Several limitations are evident during this study. Notably, there is a lack of diversity within the sample population, which could introduce potential biases during the data collection process.

Additionally, the findings' generalizability may be constrained by the specific contextual factors associated with Langsa, Aceh Province. These considerations are critical, as they may influence the model's applicability across varying settings and demographics, highlighting a vital area for further research.

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