

The Effect of Health Education Using Leaflet Media on Adolescents' Knowledge About Gastritis

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ARTICLE INFO

Manuscript Received: 3 July, 2026
Revised: 16 Aug, 2026
Accepted: 23 Aug, 2026
Date of publication: 25 Aug, 2026
Volume: 16
Issue: 1
DOI: 10.56338/promotif.v16i1.12212

KEYWORDS

Adolescents;
Gastritis;
Health education;
Knowledge;
Leaflet;
School health

ABSTRACT

Introduction: Gastritis can affect adolescents' daily functioning and may be associated with irregular eating patterns and limited knowledge of prevention. School-based health education using leaflets is a practical approach for delivering concise health information. This study evaluated changes in adolescents' knowledge of gastritis following leaflet-based health education at MTsS Serambi Mekkah, West Aceh Regency, Indonesia.

Methods: A quasi-experimental one-group pretest-posttest study was conducted among 66 students. Data were collected from January 26 to 31, 2026. Participants completed a knowledge pretest, received health education supported by a leaflet, and completed a posttest. Pre- and post-intervention knowledge scores were compared using the Wilcoxon signed-rank test.

Results: The mean knowledge score increased from 6.58 (SD 2.42) before the intervention to 8.56 (SD 2.53) after the intervention. The proportion of participants categorized as having poor knowledge decreased from 59.1% to 15.2%, while good knowledge increased from 12.1% to 33.3%. The Wilcoxon signed-rank test showed a statistically significant pre-post difference ($Z = -5.815$; $p < 0.001$).

Conclusion: Adolescents had higher gastritis knowledge scores after leaflet-based health education. Because the study used a single-group pretest-posttest design, the findings support short-term improvement after the intervention but do not establish a definitive causal effect. Controlled studies with longer follow-up are warranted.

Publisher: Fakultas Kesehatan Masyarakat Universitas Muhammadiyah Palu

INTRODUCTION

Changes in disease patterns and lifestyles have broadened the scope of epidemiology beyond infectious diseases to include a wider range of health problems (1). Gastrointestinal disorders such as gastritis are relevant to adolescent health because symptoms may interfere with daily activities, well-being, and school participation.

Gastritis is characterized by inflammation of the gastric mucosa and may be associated with irregular eating patterns, consumption of spicy or acidic foods, stress, and infection with *Helicobacter pylori* (2). Disruption of the gastric mucosal barrier allows acid and other irritants to contribute to mucosal inflammation (3).

The World Health Organization mortality database continues to record deaths attributed to gastritis and duodenitis across multiple countries (4). Indonesian reports cited in the source manuscript also describe substantial geographic variation in gastritis occurrence, including 31.7% in Aceh and 91.6% in Medan (5). The previously reported national statement of 274,396 cases among 238,452,952 people being equivalent to 40.8% was mathematically inconsistent and has therefore not been repeated in this revised manuscript.

A preliminary assessment at MTsS Serambi Mekkah Meulaboh indicated limited student knowledge about gastritis and its prevention. Students reported symptoms such as nausea, vomiting, and epigastric discomfort after

consuming spicy foods, together with irregular eating patterns. Frequent consumption of instant noodles and carbonated beverages was also noted. These observations suggested a need for accessible school-based health education on gastritis prevention.

This study aimed to determine whether adolescents' knowledge of gastritis changed after health education using leaflet media at MTsS Serambi Mekkah, West Aceh Regency. The study was intended to provide practical evidence on the use of a simple educational medium in a school setting.

METHOD

Research Type

This quantitative study used a quasi-experimental one-group pretest-posttest design. Participants completed a knowledge assessment before and after receiving health education about gastritis supported by leaflet media. The pretest-posttest comparison was used to evaluate change in knowledge following the intervention (6).

Population and Sample/Informants

The study included 66 students aged 13-16 years at MTsS Serambi Mekkah. A total sampling approach was used, whereby students who met the eligibility criteria and were available during the study period were invited to participate. Eligible participants were registered students aged 13-16 years who were present during data collection, willing to participate, and able to complete both the pretest and posttest. Students who were absent during the educational session, withdrew from participation, or returned incomplete pretest or posttest questionnaires were excluded. All 66 students who completed both assessments were included in the analysis. Among the participants, 22 (33.3%) were male and 44 (66.7%) were female.

Research Location

The study was conducted at MTsS Serambi Mekkah, West Aceh Regency, Indonesia. Data collection took place from January 26 to 31, 2026.

Instrumentation or Tools

Knowledge of gastritis was assessed using a structured 13-item questionnaire developed for the study in accordance with the educational content on gastritis. The questionnaire covered the definition of gastritis, common risk factors, signs and symptoms, dietary practices associated with gastritis, and preventive measures. Each correct response was scored 1 and an incorrect or unknown response was scored 0, producing a total knowledge score ranging from 0 to 13; higher scores indicated greater knowledge. For descriptive analysis, the scores were grouped into good, moderate, and poor knowledge according to the scoring scheme used in the study. Before data collection, the questionnaire and educational materials were reviewed for clarity, relevance, and consistency with the study objectives. Formal psychometric coefficients were not available in the study records and are therefore not reported. The leaflet was prepared as a concise educational aid and contained information on the definition, risk factors, signs and symptoms, and prevention of gastritis.

Data Collection Procedures

Participants first completed a pretest using the gastritis knowledge questionnaire. This was followed by an approximately 30-minute, classroom-based health education session delivered by the research team using the leaflet as the primary educational medium. The session included an explanation of the key leaflet content and an opportunity for brief questions and discussion. The posttest was administered immediately after completion of the educational session using the same questionnaire. Data collection was conducted from January 26 to 31, 2026.

Data Analysis

Descriptive statistics were used to summarize demographic characteristics and knowledge distributions. Pre- and post-intervention raw knowledge scores were summarized using means, standard deviations, minima, and maxima. Because the paired scores were analyzed non-parametrically, the Wilcoxon signed-rank test was used to compare pretest and posttest knowledge scores. Statistical significance was set at $p < 0.05$. A reported p -value of 0.000 in the source output is presented as $p < 0.001$ in accordance with standard statistical reporting practice.

Ethical Considerations

All research procedures were conducted with due consideration of ethical principles applicable to research involving human participants. The study emphasized respect for participants, voluntary participation, privacy, confidentiality, non-maleficence, and the protection of participants' dignity and welfare throughout the research

process. Before data collection, participants were informed about the purpose and procedures of the study and their right to decline or discontinue participation. Participant information was handled confidentially and used solely for research purposes. The educational intervention was non-invasive and was implemented in a manner intended to minimize discomfort or risk. Particular attention was given to age-appropriate communication because the participants were adolescents.

RESULTS

A total of 66 students were included in the analysis. Their demographic characteristics and pre- and post-intervention knowledge distributions are presented below.

Table 1. Demographic Characteristics of Students at MTsS Serambi Mekkah (n = 66)

No.	Category	Frequency (n)	%
Age			
1	13 years	13	19.7
2	14 years	19	28.8
3	15 years	19	28.8
4	16 years	15	22.7
Sex			
1	Male	22	33.3
2	Female	44	66.7
Grade			
1	I	18	27.3
2	II	21	31.8
3	III	27	40.9
Total		66	100.0

Source: Primary data (processed in 2026)

The largest age groups were 14 and 15 years, each comprising 19 students (28.8%). Most participants were female (44; 66.7%), and Grade III was the largest grade group (27; 40.9%).

Table 2. Pre-intervention Distribution of Knowledge About Gastritis (n = 66)

No.	Knowledge category	Frequency (n)	%	Mean category score
1	Good	8	12.1	
2	Moderate	19	28.8	
3	Poor	39	59.1	
Total		66	100.0	2.47

Source: Primary data (processed in 2026). Category coding: good = 1, moderate = 2, poor = 3.

Before the intervention, 39 students (59.1%) were categorized as having poor knowledge, 19 (28.8%) as moderate, and 8 (12.1%) as good. The mean coded category score was 2.47.

Table 3. Post-intervention Distribution of Knowledge About Gastritis (n = 66)

No.	Knowledge category	Frequency (n)	%	Mean category score
1	Good	22	33.3	
2	Moderate	34	51.5	
3	Poor	10	15.2	
Total		66	100.0	1.82

Source: Primary data (processed in 2026). Category coding: good = 1, moderate = 2, poor = 3.

After the intervention, 34 students (51.5%) were categorized as having moderate knowledge, 22 (33.3%) as good, and 10 (15.2%) as poor. The mean coded category score was 1.82.

Table 4. Pre- and Post-intervention Knowledge Scores and Wilcoxon Signed-Rank Test

Assessment	n	Mean	SD	Minimum	Maximum
Pre-intervention	66	6.58	2.42	4	12
Post-intervention	66	8.56	2.53	5	13

Source: Primary data (processed in 2026). Wilcoxon signed-rank test: $Z = -5.815$; $p < 0.001$.

The mean raw knowledge score increased from 6.58 (SD 2.42) before the intervention to 8.56 (SD 2.53) after the intervention, an increase of 1.98 points. The Wilcoxon signed-rank test indicated a statistically significant difference between pretest and posttest scores ($Z = -5.815$; $p < 0.001$). The Wilcoxon Z statistic and p -value describe the paired comparison and are therefore reported once, rather than duplicated across the pre- and post-intervention rows.

DISCUSSION

Interpretation of Key Findings

Knowledge of gastritis was higher after leaflet-based health education. The mean raw score increased by 1.98 points, the proportion of students with poor knowledge decreased from 59.1% to 15.2%, and the proportion with good knowledge increased from 12.1% to 33.3%. These changes suggest that a concise, repeatable educational medium can support short-term learning about gastritis in a school setting.

Leaflets may facilitate learning because they present information in a compact format that can be retained and reviewed independently. In the source study, the educational content addressed the definition of gastritis, risk factors, signs and symptoms, and prevention. This interpretation is consistent with the broader educational premise that increased access to understandable health information can improve knowledge, although knowledge improvement alone does not necessarily establish sustained behavioral change (3,7).

Evidence from the broader health-communication literature supports the use of concise written materials as an educational adjunct. A systematic review of patient information leaflets found that such materials generally improve patient knowledge and satisfaction, while a review comparing print and multimedia health materials found that print frequently produced outcomes comparable with multimedia formats (12,13). From a health-literacy perspective, health education is intended to strengthen the ability to access, understand, appraise, and apply health information (14,15). This is particularly relevant during adolescence, when health-related knowledge, decision-making skills, and behavioral patterns are still developing (16,17). Reviews of school-based and adolescent-focused health-literacy interventions further indicate that schools are a promising setting for structured health education, although intervention content, measurement approaches, and evidence of sustained effects remain heterogeneous (18-20).

Gastritis-related symptoms may be associated with dietary patterns and other exposures described in the cited literature, including irregular meals and frequent consumption of spicy or acidic foods (2,7). Certain forms of chronic gastritis may also be associated with clinically important complications if inadequately managed (8). These considerations support the relevance of preventive health education for adolescents while avoiding the assumption that all dyspeptic symptoms represent clinically confirmed gastritis.

The clinical context also requires a clear distinction between gastritis, *Helicobacter pylori* infection, and symptom-defined dyspepsia. International consensus recognizes *H. pylori* gastritis as an infectious disease entity and emphasizes evidence-based diagnostic and management strategies (21,22). A global systematic review and meta-analysis demonstrated that *H. pylori* infection remains highly prevalent worldwide, with substantial geographic variation (23). At the same time, dyspepsia is common globally and may arise from several organic or functional mechanisms (24). Consequently, guideline-based evaluation cautions against assuming that epigastric pain or other dyspeptic symptoms alone establish a diagnosis of gastritis (25).

Comparison with Previous Studies

The present findings are consistent with Sinaga et al., who reported increased student knowledge after health education using leaflet media (9). Kumala and Salma also reported an effect of health education on knowledge and eating patterns related to gastritis prevention among adolescents (10). Similarly, Wahyuningrum et al. reported improved community knowledge following gastritis education supported by leaflets and discussion (11).

The findings also align with the educational approach discussed in Romadonika et al., in which health education was associated with improved knowledge and prevention-related behavior (7). Together, these studies support the practical use of structured health education. However, differences in populations, educational delivery, measurement instruments, and study designs should be considered when comparing results across studies.

Limitations and Cautions

Several limitations should be considered. First, the one-group pretest-posttest design did not include a control group, so the observed improvement cannot be attributed exclusively to the leaflet intervention; testing effects, concurrent learning, or other influences may have contributed. Second, the study was conducted at a single school with 66 participants, which limits the generalizability of the findings. Third, knowledge was measured using a study questionnaire for which formal psychometric coefficients were not available in the research records. Fourth, the posttest was conducted immediately after the educational session; therefore, the findings primarily reflect short-term knowledge change rather than sustained retention. Finally, the study assessed knowledge rather than preventive behavior, dietary change, or clinically confirmed gastritis outcomes. These limitations should be considered when interpreting the statistically significant pre-post difference.

Recommendations for Future Research

Future studies should use controlled or randomized designs where feasible, recruit larger and more diverse samples, report validated knowledge instruments, and include longer follow-up periods. Evaluating behavioral outcomes such as meal regularity, food choices, and appropriate care-seeking would help determine whether knowledge gains translate into meaningful preventive practices. Detailed reporting of intervention content and implementation would also improve reproducibility.

CONCLUSION

Among 66 students at MTsS Serambi Mekkah, West Aceh Regency, knowledge scores were significantly higher after leaflet-based health education than before the intervention (6.58 vs 8.56; $Z = -5.815$; $p < 0.001$). The proportion with poor knowledge decreased from 59.1% to 15.2%. These findings support leaflets as a practical school-based educational medium for improving short-term gastritis knowledge. Because the study lacked a comparison group and long-term follow-up, controlled studies are required before drawing stronger causal conclusions or inferring sustained behavioral effects.

AUTHOR'S CONTRIBUTION STATEMENT

All authors contributed substantially to the conception and design of the study, data acquisition, analysis and interpretation of the findings, and preparation or critical revision of the manuscript. All authors reviewed and approved the final version of the manuscript and agree to be accountable for the integrity and accuracy of the work.

CONFLICTS OF INTEREST

The authors declare that they have no known financial or personal conflicts of interest that could have influenced the work reported in this manuscript.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this manuscript, the authors used ChatGPT (OpenAI) to support English-language refinement, clarity, structural editing, and formatting. The authors subsequently reviewed and revised the content and take full responsibility for the accuracy, integrity, originality, and final content of the manuscript.

SOURCE OF FUNDING STATEMENTS

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ACKNOWLEDGMENTS

The authors gratefully acknowledge the leadership, teachers, and students of MTsS Serambi Mekkah, West Aceh Regency, for their cooperation and participation during the research.

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