



Research

Comparison of the Effectiveness of Flipbook and Leaflet Media on Gastritis Prevention Behaviors among Junior High School Adolescents in Bulukumba Regency

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ABSTRACT

Gastritis is an inflammation of the gastric mucosa that can occur acutely or chronically and is closely associated with foodborne diseases. Adolescents are a vulnerable group to gastritis, making early prevention through school-based health promotion essential. This study aimed to compare the effectiveness of flipbook and leaflet media on gastritis prevention behaviors among junior high school students in Bulukumba Regency. A quasi-experimental study with a control group pretest-posttest design was conducted involving 131 respondents selected through purposive sampling. Data were collected using structured pretest and posttest questionnaires that had been validated and proven reliable. Statistical analyses were performed using the Wilcoxon test and Kruskal-Wallis test. The results showed improvements in knowledge, attitudes, and practices across all groups after the intervention. Flipbook media were more effective in improving students' knowledge (mean rank 74.90; $p=0.052$) and attitudes (mean rank 98.18; $p=0.000$). In contrast, leaflet media demonstrated greater effectiveness in improving preventive practices (mean rank 75.66; $p=0.054$). In conclusion, health promotion media significantly influence gastritis prevention behaviors among adolescents. Flipbooks are more effective in enhancing cognitive and affective domains, while leaflets are more effective in improving psychomotor aspects. Strengthening school-based health programs is recommended to promote healthy lifestyles among students.

1. Introduction

Communicable diseases are among the most common health problems affecting populations in developing countries. Communicable diseases are caused by bacteria, viruses, or parasites and can

be transmitted through specific media (Fauziah, 2020). Along with the development and modernization of lifestyles, unhealthy living patterns and bacterial transmission have contributed to an increasing burden of disease.

Gastritis is an inflammation of the gastric mucosa that causes abdominal pain (Shalahuddin, 2018). One of its causes is *Helicobacter pylori*, a bacterium classified as a foodborne pathogen that commonly enters the human body through contaminated food (Chlebicz, 2018). Gastritis is caused by irritation and infection and is characterized by upper abdominal discomfort, nausea, vomiting, loss of appetite, and headaches. If gastritis is not treated promptly and appropriately, it may impair gastric function and increase the risk of fatal gastric cancer. Several studies have reported that functional gastritis is often associated with dyspeptic symptoms, accounting for approximately 70–80% of all cases (Hidayatullah et al., 2017).

Gastritis frequently affects adolescents aged 13–15 years who are attending junior high school, a developmental stage characterized by identity formation. Adolescents may engage in extreme dieting behaviors with irregular and unhealthy eating patterns to achieve an ideal body shape. In addition, academic and organizational activities often lead to missed meals and increased consumption of fast food, spicy, acidic, and fatty foods (Sumangkut & Karundeng, 2018).

These conditions require special attention because they may have long-term health consequences. Therefore, adequate knowledge and positive attitudes are essential for both treatment and early prevention of gastritis. Preventive measures include avoiding unhealthy lifestyles and foods that exacerbate gastric acid secretion, such as cucumbers, vinegar, chili sauce, and alcohol, which may increase the prevalence of gastritis (Shalahuddin, 2018).

According to the World Health Organization (WHO), approximately 1.8–2.1 million cases of gastritis occur annually worldwide. The highest prevalence rates are reported in the United Kingdom (22%), China (31%), Japan (14.5%), Canada (35%), and France (29.5%) (Gustin, 2011). In Indonesia, the prevalence of gastritis in 2017 reached 40.8% (Hidayatullah et al., 2017). Data from the 2018 National Basic Health Research (Riskesmas) indicated that gastritis remains highly prevalent, affecting 40.8% of the population, with 274,396 cases among 238,452,952 individuals. Three cities reported particularly high prevalence rates: Surabaya (31.2%), Denpasar (46%), and Medan (91.6%). Gastritis is also among the ten most common diseases reported in public health centers in South Sulawesi, with 282,739 cases in 2017, 125,316 cases in 2018, and 140,412 cases in 2020.

In Bulukumba Regency, gastritis is one of the ten most frequently reported diseases, with 14,675 cases, ranking second after hypertension (Central Bureau of Statistics, 2020). Preliminary data from the Ponre Primary Health Center in Gantarang District showed an increase in gastritis cases from 24 to 66 cases in September 2023 and from 20 to 59 cases in October 2023.

According to Notoatmodjo (2012), factors influencing the occurrence of gastritis include knowledge and behavior related to disease prevention. Individual actions (overt behavior) are strongly influenced by knowledge. Responses to illness, health care systems, food and beverages, and environmental factors are collectively referred to as health behavior.

Based on the above background, this study aimed to examine the comparative effectiveness of flipbook and leaflet media on gastritis prevention behaviors among adolescents.

2. Method

This study employed a quantitative approach using a quasi-experimental design with a control group pretest-posttest format. The design was intended to assess the effectiveness of flipbook and leaflet media in supporting gastritis prevention among adolescents.

Data analysis to determine the effect of health promotion media on knowledge, attitudes, and practices was conducted using the Wilcoxon test. The Kruskal-Wallis test was used to compare the effectiveness of the three health promotion media groups.

The study was conducted in three public junior high schools in Bulukumba Regency: SMP Negeri 5 Bulukumba, SMP Negeri 8 Bulukumba, and SMP Negeri 6 Bulukumba. The study period began on February 1, 2024, and continued until the publication of the research article.

3. Results & Discussion

Tabel 1 *Distribution of Respondents by Grade Level, Age, and Gender at Public Junior High Schools in Bulukumba Regency, 2024*

Group	Variable	Frequencies (f)	Percentage(%)
Flipbook	Grade	7	11
		8	13
		9	20
	Age	12	6
		13	6
		14	22
		15	10
	Sex	Male	17
		Female	27
Leaflet	Grade	7	13
		8	14
		9	17
	Age	13	11
		14	13
		15	20
	Sex	Male	24
		Female	20
Control	Grade	7	9
		8	16
		9	19

Age		
13	10	22,7
14	17	38,6
15	17	38,6
Sex		
Laki-Laki	18	40,9
Perempuan	26	59,1

The characteristics of respondents in this study were classified by grade level, age, and gender. A total of 132 respondents were divided equally into three groups: the flipbook group (SMP Negeri 5 Bulukumba), the leaflet group (SMP Negeri 8 Bulukumba), and the control group (SMP Negeri 6 Bulukumba), with 44 respondents in each group.

In the flipbook group, most respondents were in grade 9 (45.5%), aged 14 years (50.0%), and predominantly female (61.4%). In the leaflet group, the majority were also grade 9 students (38.6%), aged 15 years (45.4%), with a higher proportion of males (54.5%). In the control group, most respondents were grade 9 students (43.2%), aged 14–15 years (each 38.6%), and predominantly female (59.1%).

Tabel 2 Distribution of Pretest–Posttest Scores Based on Knowledge, Attitudes, and Practices among Public Junior High School Students in Bulukumba Regency, 2024

Variable	N	Frekuensi						
		Knowledge			Attitude		Action	
		Good	Adequate	Poor	Positif	Negatif	Positif	Negatif
Flipbook								
Pre	44	0	17	27	29	15	30	14
%		0	38.6	61.4	65.9	34.1	68.2	31.8
Post		38	6	0	43	1	41	3
%		86.4	13.6	0	97.7	2.3	93.2	6.8
Leaflet								
Pre	44	1	14	29	28	16	30	14
%		2.3	31.8	65.9	63.6	36.4	68.2	31.8
Post		41	3	0	43	1	39	5
%		93.2	6.8	0	97.7	2.3	88.6	11.4
Kontrol								
Pre	44	3	34	7	32	12	31	13
%		6.8	77.2	15.9	72.7	27.3	70.4	29.5
Post		38	6	0	43	1	37	7
%		86.4	13.6	0	97.7	2.3	84.1	15.9

Pretest–posttest results demonstrated improvements in knowledge, attitudes, and practices across all groups. In the flipbook group, the proportion of respondents with good knowledge

increased from 0% at pretest to 86.4% at posttest. Positive attitudes increased from 65.9% to 97.7%, while positive practices increased from 68.2% to 93.2%.

In the leaflet group, good knowledge increased from 2.3% to 93.2%, positive attitudes from 63.6% to 97.7%, and positive practices from 68.2% to 88.6%. In the control group, good knowledge increased from 6.8% to 86.4%, positive attitudes from 72.7% to 97.7%, and positive practices from 70.4% to 84.1%.

Tabel 3 Normality Test of Data in the Flipbook Experimental Group, Leaflet Experimental Group, and Control Group

Kelompok	N	Asymp.Sig Pengetahuan		Asymp.Sig Sikap		Asymp.Sig Tindakan	
		Pre	Post	Pre	Post	Pre	Post
Flipbook	44	0.000	0.000	0.000	0.000	0.005	0.000
Leaflet	44	0.020	0.000	0.018	0.072	0.007	0.041
Kontrol	44	0.005	0.000	0.007	0.000	0.021	0.000

Source : Primary Data , 2024

Normality testing using the Kolmogorov-Smirnov test showed that most pretest and posttest data across the flipbook, leaflet, and control groups were not normally distributed ($p < 0.05$). Therefore, non-parametric statistical tests were applied for further analysis.

Tabel 4 Distribusi Pengetahuan, Sikap dan Tindakan Responden pada Media Flipbook di SMP Negeri 5 Bulukumba Tahun 2024

Analysis Results	Knowledge		Attitude		Action	
	Pre	Post	Pre	Post	Pre	Post
Min	13	66	33	50	40	50
Max	73	100	80	93	80	91
Mean	53.27	81.39	54.36	86.14	64.43	84.09
Std.Deviation	12.935	7.049	10.153	6.465	9.317	6.317
ΔMean	28.12		31.78		19.66	
Wilcoxon Signed Ranks Test	0.000		0.000		0.000	

In the flipbook group, the mean knowledge score increased from 53.27 to 81.39 ($\Delta\text{Mean} = 28.12$), attitude scores increased from 54.36 to 86.14 ($\Delta\text{Mean} = 31.78$), and practice scores increased from 64.43 to 84.09 ($\Delta\text{Mean} = 19.66$). Wilcoxon Signed Ranks Test results showed statistically significant differences for all variables ($p = 0.000$), indicating that flipbook media were effective in improving adolescents' knowledge, attitudes, and practices related to gastritis prevention.

Tabel 5 Distribution of Knowledge, Attitudes, and Practices among Respondents Exposed to Leaflet Media at Public Junior High School 8 Bulukumba, 2024

Analysis Result	Pengetahuan		Sikap		Tindakan	
	Pre	Post	Pre	Post	Pre	Post
Min	46	73	47	50	48	50
Max	80	100	80	96	76	93
Mean	57.98	80.98	55.11	85.61	69.05	87.98
Std.Deviation	9.262	4.939	8.976	3.411	3.634	2.749

Δ Mean	23.00	30.50	18.93
Wilcoxon Signed Ranks Test	0.000	0.000	0.000

In the leaflet group, mean knowledge scores increased from 57.98 to 80.98 (Δ Mean = 23.00), attitudes from 55.11 to 85.61 (Δ Mean = 30.50), and practices from 69.05 to 87.98 (Δ Mean = 18.93). Wilcoxon test results confirmed significant improvements across all variables ($p = 0.000$), indicating that leaflet media were also effective.

Tabel 6 Distribution of Knowledge, Attitudes, and Practices among Respondents in the Control Group at Public Junior High School 6 Bulukumba, 2024

Hasil Analisis	Pengetahuan		Sikap		Tindakan	
	Pre	Post	Pre	Post	Pre	Post
Min	40	66	50	50	48	50
Max	80	93	73	90	76	91
Mean	60.77	78.80	69.05	83.80	67.36	85.50
Std.Deviation	7.782	5.684	3.634	2.119	3.648	2.849
Δ Mean	18.03		14.75		18.14	
Wilcoxon Signed Ranks Test	0.000		0.000		0.000	

In the control group, mean knowledge scores increased from 60.77 to 78.80 (Δ Mean = 18.03), attitudes from 69.05 to 83.80 (Δ Mean = 14.75), and practices from 67.36 to 85.50 (Δ Mean = 18.14). Wilcoxon test results showed statistically significant improvements ($p = 0.000$), despite the absence of specific educational media.

Tabel 7 Differences in the Effectiveness of Health Promotion Media among the Flipbook Group, Leaflet Group, and Control Group

Media	Knowledge		Attitude		Action	
	Δ Mean	P Value	Δ Mean	P Value	Δ Mean	P Value
Flipbook	28.12		31.78		19.66	
Leaflet	23.00	0.052	30.50	0.000	18.93	0.054
Kontrol	18.03		14.75		18.14	

Based on Table7, the results of data analysis using the Kruskal-Wallis test showed that the significance values for knowledge and practices were 0.052 and 0.054, respectively. Since the p-values were greater than 0.05, there was no statistically significant difference among the flipbook group, leaflet group, and control group in improving respondents' knowledge and practices related to gastritis prevention among junior high school adolescents in Bulukumba Regency.

In contrast, the significance value for attitudes was 0.000. Because the p-value was less than 0.05, a statistically significant difference was found among the flipbook group, leaflet group, and control group in improving respondents' attitudes toward gastritis prevention among junior high school adolescents in Bulukumba Regency.

The bivariate analysis showed that the Δ Mean values for the knowledge variable were 28.12 points for the flipbook group, 23.00 points for the leaflet group, and 18.03 points for the control group. For the attitude variable, the Δ Mean values were 31.78 points for the flipbook group, 30.50 points for the leaflet group, and 14.75 points for the control group. Meanwhile, the Δ Mean values for the practice variable were 19.66 points for the flipbook group, 18.93 points for the leaflet group, and 18.14 points for the control group.

Tabel 8 Post Hoc Analysis of Attitudes Based on Kruskal–Wallis Test Results

Sample	Test Statistic	Std. Test Statistic	Adj.Sig
Control-Leaflet	20.955	2.711	0.020
Control-Flipbook	58.000	7.504	0.000
Leaflet–Flipbook	37.045	4.793	0.000

Kruskal–Wallis test results showed no significant differences among the three groups in terms of knowledge ($p = 0.052$) and practices ($p = 0.054$). However, a significant difference was found for attitudes ($p = 0.000$). Post hoc analysis revealed significant differences between all pairs of groups, with the flipbook group showing the highest mean rank. Overall, the flipbook media demonstrated the greatest effectiveness, with the highest Δ Mean values for knowledge (28.12), attitudes (31.78), and practices (19.66).

The findings of this study demonstrate that both flipbook and leaflet media significantly improved respondents' knowledge, attitudes, and practices regarding gastritis prevention, with the flipbook intervention showing the greatest overall effect. In the flipbook group, substantial increases were observed in knowledge (Δ Mean = 28.12), attitudes (Δ Mean = 31.78), and practices (Δ Mean = 19.66). These results are consistent with previous studies reporting the effectiveness of flipbook media in enhancing learning outcomes and health-related behaviors (Aprilia, 2021; Lestari et al., 2024; Ambarwati et al., 2023).

The superiority of flipbook media can be attributed to its interactive and visually engaging format, which facilitates better comprehension and retention of information. This finding aligns with studies demonstrating that flipbook-based health promotion improves knowledge and attitudes more effectively than conventional media (Widyasari, 2022; R, Diana, 2021; Wibowo et al., 2023; Jajuli et al., 2023; Oktarina et al., 2021; Lakapu et al., 2023; Anggrasari et al., 2021).

Leaflet media also resulted in meaningful improvements in knowledge (Δ Mean = 23.00), attitudes (Δ Mean = 30.50), and practices (Δ Mean = 18.93). These findings support previous evidence that leaflets are effective tools for health education, particularly in improving knowledge and reinforcing preventive behaviors (Anisha Tiara & Farit, 2017; Simbolon et al., 2023; Syarfaini et al., 2023; Fauziah et al., 2020; Wijaya, 2023; Sundari, 2021; Jayadi et al., 2023).

Although the control group also showed improvements in knowledge, attitudes, and practices, the magnitude of change was lower than that observed in the intervention groups. This indicates that health education alone can influence behavior, but the use of appropriate media enhances its effectiveness (Sumangkut, 2018; Jayadi et al., 2022).

Overall, the comparative analysis confirms that flipbook media is more effective than leaflet media and no-media interventions in improving adolescent knowledge, attitudes, and practices related to gastritis prevention. From a behavioral perspective, these findings support the Knowledge-Attitude-Practice (KAP) framework, while also acknowledging that behavior change does not always follow a linear progression (Mahendra et al., 2019).

4. Conclusion

This study demonstrates that both flipbook and leaflet health promotion media are effective in improving knowledge, attitudes, and practices related to gastritis prevention among public junior high school students in Bulukumba Regency. However, the flipbook intervention consistently produced the greatest improvements across all behavioral domains. In the knowledge domain, the flipbook group showed the highest pretest-posttest mean difference (28.12 points), followed by the leaflet group (23.00 points) and the control group (18.03 points). These findings indicate that digital and interactive media are more effective in enhancing adolescents' understanding of gastritis prevention compared to printed materials or education without media.

Similar trends were observed for attitudes and practices. The flipbook group achieved the largest improvement in attitudes ($\Delta\text{Mean} = 31.78$), closely followed by the leaflet group ($\Delta\text{Mean} = 30.50$), while the control group showed a substantially smaller increase ($\Delta\text{Mean} = 14.75$). In terms of practices, the flipbook intervention again resulted in the highest improvement ($\Delta\text{Mean} = 19.66$), compared with the leaflet group ($\Delta\text{Mean} = 18.93$) and the control group ($\Delta\text{Mean} = 18.14$). Overall, these results confirm that flipbook media are more effective than leaflet media and no-media interventions in promoting positive behavioral changes.

In conclusion, while leaflet-based education remains beneficial, flipbook media offer superior effectiveness due to their interactive, visual, and engaging features. Therefore, flipbook media are strongly recommended for school-based health promotion programs aimed at preventing gastritis among adolescents.

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