

Efficacy of turmeric (*Curcuma longa* Linn) decoction to reduce pain in patients with gastritis

Ismansyah Ismansyah,¹ Frana Andrianur,¹ Rini Ernawati²

¹Health Polytechnic, Ministry of Health, East Kalimantan, Samarinda; ²Faculty of Nursing, Muhammadiyah University of East Kalimantan, Samarinda, Indonesia

Abstract

Turmeric (*Curcuma longa* Linn) has been used by Indonesian people for a long time to treat pain in digestive disorders. The pur-

Correspondence: Ismansyah Ismansyah, Politeknik Kesehatan Kemenkes Kalimantan Timur, Samarinda, Indonesia.
E-mail: ismanamin18@gmail.com

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pose of this study was to determine the efficacy of turmeric decoction on pain in gastritis patients. This study employed a quasi-experimental design with a one-group pre- and post test approach. The consecutive sampling method was employed to recruit 100 participants in Samarinda, Indonesia. After assessing baseline pain levels (Pretest), participants were administered the intervention, which involved the consumption of turmeric decoction for 14 consecutive days, with a regimen of 2×150 mL daily, specifically 15 minutes before breakfast and dinner. Post-test measurements were recorded on days 5, 10, and 14. Pain scores were evaluated using the Numeric Rating Scale, Data analysis utilized the paired T-test to determine differences in mean gastritis pain levels before and after the intervention. The findings revealed a significant reduction in gastritis pain scores between the Pretest measurements is 3.8 and the post-test on day 5 (1.34), day 10 (0.62), and day 14 (0.31). The statistical analysis yielded a p-value of 0.000. The study demonstrated the efficacy of turmeric decoction in alleviating pain among gastritis patients, with notable improvements observed as early as day 5 of the treatment regimen. Consequently, we recommend the incorporation of turmeric decoction as a complementary and non-pharmacological therapeutic approach for the effective management of gastritis symptoms.

Introduction

Gastritis is a digestive tract disorder with the most frequent causes are the use of Nonsteroidal Anti-Inflammatory Drugs (NSAIDs), corticosteroids, lifestyles with high levels of stress,^{1,2} helicobacter,^{3,4} consumption of alcohol, coffee, and smoking and the attitude of gastritis sufferers who pay less attention to the food consumed every day.^{3,5-7} The complication of this disease is gastric bleeding which causes the patient to die.³

Gastritis in Indonesia amounted to 40.8% in 2018 with almost the same variation in every region in Indonesia.^{8,9} Data from the Samarinda City Health Office, gastritis is included in the top 10 visits at the Public Health Center in 2022¹⁰. Acute gastritis has symptoms of nausea and pain such as burning or discomfort in the epigastrium.^{11,12} Among the non-pharmacological measures that can overcome pain is to use herbal medicine or traditional medicine, namely turmeric.^{11,13} The *curcuminoid* content in turmeric functions as an herbal medicine to relieve pain in the injured gastric mucosa and can reduce stomach acid levels.^{11,14}

Turmeric is an herbal therapy that has long been known to the Indonesian people as a health drink and is used to treat gastritis pain complaints as a complementary approach or non-pharmacological therapy.¹⁵ Turmeric (*Curcuma longa* Linn) is a safe and non-toxic ingredient that is safe for consumption.^{16,17} Turmeric is an herbal therapy ingredient and is used as traditional medicine.¹⁸ Turmeric (*C. longa* L.) is a type of tropical plant from the Zingiberaceae family.¹⁹ The content of turmeric rhizome, especially curcumin, is known to have many pharmacological effects and

has been shown to exhibit high antibacterial,²⁰ anticarcinogenic, anti-inflammatory,^{21,22} and antioxidant properties and has immunosuppressive activity.^{23,24} The anti-inflammatory mechanism of curcumin is by inhibiting prostaglandins and proinflammatory cytokines, COX-2, iNOS, NF-kB, AP-1 and also MMP.²⁵

Empirically, the researcher’s experience while working in the community, found that for generations, people have used turmeric decoction to treat various complaints they experience, including complaints of indigestion. People consume turmeric to reduce pain, but research on the benefits of turmeric, especially to reduce gastritis pain, is still lacking. This study aims to determine the effectiveness of turmeric decoction to treat pain in gastritis patients in Samarinda, Indonesia.

Materials and Methods

Research design

This type of research is a pseudo-experiment, to determine the efficacy of turmeric decoction on gastritis patient pain with a *one group pre and post test design* approach. The study was conducted for 2 months from April 01 to May 30, 2023, at the Community Health Center in Samarinda, Indonesia. Researchers met participants at the Community Health Center and then continued with home visits. Participants were given a turmeric decoction which was consumed for 14 days without a break. The rules for consuming 2×150 mL are 15 minutes before breakfast and dinner. The first day a pre-test was conducted, then turmeric decoction was given, day 5 post test I, day 10 post test II and day 14 post test III. Post test measurements were taken 3 times to determine differences in the effect of *Curcuma longa Linn* decoction on pain. The schedule for consuming turmeric decoction was controlled through text messages to participants to ensure the intervention was carried out according to schedule.

Research participants

The participants of this study were gastritis patients, totaling 100 participants, obtained by *consecutive sampling* method. Participants who met the criteria and were willing to participate were sampled, conducted a pre-test and continued to provide interventions with home visits. Participants were aged between 17 years and 45 years, diagnosed with gastritis, experiencing mild pain and not taking analgesic drugs.

Variables, instruments and data collection

The dependent variable measured was gastritis pain, measured pretest and 3 times post test measurements, namely on day 5, day 10 and day 14. The instrument used was the *Numeric Rating Scale* (score 0-10).¹

Data analysis

The data analysis used is the dependent t test through data processing software. The pre-test measurement results were compared with Post test 1 (Day 5), post test 2 (Day 10) and post test 3 (Day 14). The degree of confidence was set at 95% ($\alpha=0.05$).

Ethical clearance

This study has received a certificate of ethical clearance from the Ethical Review Commission of the East Kalimantan Health Polytechnic, according to the ethical review certificate No. DP.04.03/7.1/07746/2023. During the research, the researchers paid full attention to the fulfillment of ethical principles, imple-

menting informed consent, respect for human rights, confidentiality, beneficence and non-maleficence.

Results

Based on Table 1, it was found that the characteristics of participants based on gender were 89 participants (89%) female and the remaining 11 participants (11%) were male, the age of participants 51 (51%) participants were between 17-25 years old, 27 (27%) were 36-45 years old and 22 (22%) were between 26-35 years old. While the participants’ education level, 64 (64%) high school, 19 (19%) junior high school, 14 (14%) higher education and the remaining 3 (3%) elementary school. 70 (70%) did not have a job, 27 (27%) worked in the private / self-employed sector and 3 (3%) as Civil Servants, based on the length of time suffering from gastritis were participants who suffered from gastritis for 1 month as many as 35 participants (35%), for 2 months as many as 40 participants (40%), and for 3 months as many as 25 participants (25%).

Based on Table 2, it is known that the pain score experienced by participants (gastritis patients), the highest in the *pre-test* was 6.00, the lowest pain score was 3.00, mean 3.83, median 4.00, mode 4.00, and standard deviation value 0.68. The highest pain score in Post test 1 (Day 5) was 3.00 and the lowest pain score was 1.00, mean 1.34, median 1.00, mode 1.00 and standard deviation

Table 1. Characteristics of participants by gender, age, education, occupation. In Samarinda, Indonesia (N=100).

Indicator	n	%
Gender		
Female	89	89
Male	11	11
Age		
17-25	51	51
26-35	22	22
36-45	27	27
Education		
Elementary school	3	3
Junior high school	19	19
High school	64	64
Higher education	14	14
Job		
Not working	70	70
Civil servant	3	3
Private/self-employed	27	27
Duration of gastritis		
1 month	35	35
2 months	40	40
≥ 3 months	25	25

Table 2. Results of pre and post test pain score measurements.

Pain	Pre test	Post Test 1 (Day 5)	Post Test 2 (Day 10)	Post Test 3 (Day 14)
Mean	3.83	1.34	0.62	0.31
Median	4.00	1.00	1.00	0.00
Mode	4	1	1	0
Standard deviation	0.68	0.536	0.546	0.465
Min-Max	3-6	1-3	0-2	0-1

value 0.536, Post test 2 (Day 10) the highest pain score was 2.00 and the lowest pain score was 0.00, mean 0.546, median 1.00, mode 1.00 and standard deviation value 0.546, and Post test 3 (Day 14) the highest pain score was 1.00 and the lowest pain score was 0.00, mean 0.31, median 0.00, mode 0.00 and standard deviation value 0.465.

Based on Table 3, the results of the paired t test of pain scores between Pretest, Post test 1 (Day 5), post test 2 (Day 10) and post test 3 (Day 14), obtained $p=0.000 < \alpha=0.05$. The difference in pain scores between pretest and post test 1 = 2.49 pain scale scores. The difference in pain scores between Post test 1 (Day 5) and post test 2 (Day 10) was 0.72 and the difference in pain scores between post test 2 (Day 10) and post test 3 (Day 14) was 0.31.

Discussion

The results of this study prove the efficacy of turmeric decoction against gastritis pain which is characterized by a decrease in pain scores after being given turmeric decoction. After 5 days of consuming turmeric decoction, there was a significant decrease, from an average pain of 3.86 down to 1.34 (a difference of 2.49), on day 10 the pain decreased from 1.34 to 0.62 (a decrease of 0.72), on day 14 there was a decrease in pain score to 0.31 (a decrease of 0.31). Statistically there is still a decrease in the pain scale in the 2nd and 3rd measurements, but clinically there is no significant difference because it is in the mild category of pain.

Curcumin found in turmeric is a potential agent for controlling pain due to irritation of the gastric mucosal epithelium due to inflammation in gastritis, including gastritis caused by *Helicobacter pylori*.^{26,27} A common result of inflammation is pain.^{11,27} If allowed to continue, it can cause progressive damage to tissues and organs, especially the gastric mucosal epithelium. Traditional communities in Indonesia have been using non-pharmacological approaches, namely turmeric as a natural remedy to treat epigastric pain and other digestive disorders.²⁸ Turmeric, is a plant that is often used as a traditional medicine that can empirically reduce pain due to inflammation in the body. One of the active substances of *Curcuma longa Linn* is curcumin.^{18,23,27} A number of studies have reported that curcumin has various biological activities including antimicrobial, anti-oxidant, anti-tumor and anti-inflammatory effects.^{18,29} In addition, curcumin has some immunosuppressive activity, increasing the phagocytic activity of macrophages, including the expression of cytokines such as IL-1 and TNF- α .^{28,30}

Curcuminoids are components that give yellow color which are antioxidants and have properties such as hypocholesteromic, cholagogue, choleric, bacteriostatic, spasmolytic, antihepatotoxic, and anti-inflammatory.^{4,13,30} *Curcuminoids* are components that give yellow color which are antioxidants and have properties such as hypocholesteromic, cholagogue, choleric, bacteriostatic, spasmolytic, antihepatotoxic, and anti-inflammatory.^{18,29} *Curcumin* is

reported to have multicellular activity because it can ward off and reduce the risk of various diseases including antiproliferation and antioxidant by inhibiting 97.3% of cellular lipid peroxidation activity, binding to various types of cell proteins and inhibiting enzyme kinase activity, regulating cellular transcription factor activity, expression of inflammatory enzymes, cytokines, molecular adhesion, decreasing cyclin D1, cyclin E and increasing gene expression mechanism of p21, p27 and p53 in the process of carcinogenesis.^{23,27} The physical properties of *curcumin* which is a flavonoid compound insoluble in water but soluble in ethanol, *dimethylsulfoxid*, and acetone. *Curcumin* has a boiling point of 183°C.³⁰

Efficacy of turmeric decoction (*Curcuma longa Linn*) against gastritis pain

A total of 100 gastritis participants experienced an average pretest pain score of 3.83, gradually decreasing to 1.34 on day 5, and 0.62 on day 10, on day 14 down to 0.31. A significant decrease in pain scores occurred in Post test 1 (Day 5). The difference in pain scores between pre test and Post test 1 (Day 5) was 2.49. The results showed that the administration of turmeric decoction was effective in reducing pain scores because turmeric decoction is an herbal plant containing *curcumin* which can reduce stomach acid levels and prevent gastric infections that cause pain in the stomach. Curcumin compounds contained in the rhizome of *C. longa L.* have anti-inflammatory effects on gastritis.^{4,14,16} In addition to working as an analgesic, the anti-inflammatory effect of *Curcumin Longa Linn* helps reduce pain and accelerate the healing process in gastritis patients. Curcumin contained in turmeric can inhibit the occurrence of cyclooxygenase (COX) reactions so that it can inhibit and reduce inflammation and inhibit and reduce pain and have an effect as an analgesic.³¹⁻³³ The efficacy of curcumin to reduce pain is also shown in cases of osteomyelitis.¹⁷

Turmeric decoction is proven to reduce pain in gastritis sufferers and long-term use can cure gastritis.^{22,27} The content of turmeric (curcumin) can accelerate reepithelialization, cell proliferation and act as an antioxidant.^{22,24} Turmeric can inhibit histamine H2 (RH2) receptors directly and inhibit gastrin receptors so that gastric acid secretion decreases.²¹ Through this mechanism, gastritis pain can decrease because gastric mucosal epithelial irritation is prevented or inhibited.^{21,26} Another benefit of turmeric is that it can protect the gastric mucosa by increasing mucus secretion and has a vasodilator effect so it is very useful for increasing the resistance of the gastric mucosa and coating the epithelial surface of the gastric mucosa from ulcers.^{24,25} Studies show that turmeric and its major curcumin compounds are effective as gastroprotective agents.^{13,16} In various models of gastric ulceration such as in pyloric ligation, indomethacin, reserpine, and hypothermic restraint stress. In vitro studies have shown that curcumin is effective on *Helicobacter pylori* bacterial infection.¹¹

Conclusions

The efficacy of turmeric decoction in reducing pain was observed in gastritis patients, with significant improvements noted to occur from day 5 of treatment. Based on these results, the researchers recommend the use of turmeric decoction as a complementary and non-pharmacological therapeutic approach in the effective management of gastritis symptoms.

Table 3. Test of differences in mean pain scores between pretest, post test 1, post test 2 and post test 3.

Test	Average pain score	SD	n	p
Pre	3,83	0,68	100	0,000
Post test 1 (Day 5)	1,34	0,536	100	0,000
Post test 2 (Day 10)	0,62	0,546	100	0,000
Post test 3 (Day 14)	0,31	0,465	100	0,000

References

1. Krebs EE, Carey TS, Weinberger M. Accuracy of the pain numeric rating scale as a screening test in primary care. *J Gen Intern Med* 2007;22:1453-8.
2. Andreas. Hubungan Pola Makan dengan Kejadian Gastritis di Puskesmas Marina Permai No Title. *J Surya Med* 2020;08: 159-65.
3. Sepdianto TC, Abiddin AH, Kurnia T. Asuhan Keperawatan Pada Pasien Gastritis di RSUD Wonolangan Probolinggo: Sebuah Studi Kasus. *J Ilm Kesehat Sandi Husada* 2022;11:220-5.
4. Foryst-Ludwig A, Neumann M, Schneider-Brachert W, Naumann M. Curcumin blocks NF-kappaB and the mitogenic response in Helicobacter pylori-infected epithelial cells. *Biochem Biophys Res Commun* 2004;316:1065-72.
5. Bela. Hubungan Konsumsi Lemak Hewani, Makanan Pedas, Dan Minuman Tinggi Kafein Dengan Kejadian Gastritis Pada Mahasiswa Poltekkes Kemenkes Malang. *J Gizi* 2022;1:21-8.
6. Zainurridha Y. Stres dan Pola Makan terhadap Kejadian Gastritis pada Mahasiswa Keperawatan Stikes Bhakti Al-Qodiri. *J Keperawatan dan Kebidanan* 2021;6:69.
7. Hastari NK, Putri TH. Hubungan kecemasan dan pola makan dengan kejadian gastritis pada masa pandemi COVID-19. *Keperawatan Jiwa* 2023;11:215-24.
8. Wardani P. Gambaran Karakteristik Gastritis Kronis di Poli Penyakit Dalam Rumah Sakit Haji Medan Tahun 2020. *J Kedokt STM* 2020;6:366.
9. RI kementerian K. Laporan hasil riset kesehatan dasar. 2023. Available from: <https://www.badankebijakan.kemkes.go.id/laporan-hasil-survei/>
10. Samarinda DKK. Data puskesmas dengan 10 besar penyakit gastritis di Samarinda. 2022.
11. Fajriyah N, Dermawan D. Penatalaksanaan Manajemen Nyeri: Relaksasi Autogenik dan Pemberian Air Kunyit dengan Masalah Keperawatan Nyeri pada Pasien Gastritis di Desa Nguter. 2022;1:34.
12. Silaban LY. Karakteristik pasien gastritis di Rumah Sakit Santa Elisabeth Medan tahun 2018. *J Kedokt STM* 2022;6. Available from: <https://repository.stikeselisabethmedan.ac.id/wp-content/uploads/2022/01/DEVI-PARDEDE.pdf>
13. Kapoor S. Curcumin and its emerging role in pain modulation and pain management. *Korean J Pain* 2012;25:202-3.
14. Ari DNM. Gambaran Penggunaan Jamu Ekstrak Kunyit pada Penderita Gastritis Kronis di Desa Sibang Gede Kecamatan Abiansemal Kabupaten Badung. 2022.
15. Ni Kd Rintan Listiani Ekayanti. Pemanfaatan Tanaman Herbal Dalam Pengobatan Nyeri Berdasarkan Kearifan Lokal Bali Usada Tiwang. *Pros Work dan Semin Nas Farm* 2023;1:396-405.
16. Yashavanth HS, Haniadka R, Rao S, et al. Turmeric and its principal polyphenol curcumin as a nontoxic gastroprotective agent: Recent update. *Polyphenols Prev Treat Hum Dis* 2018;319-25.
17. Vahid Soleimani AS. Turmeric (*Curcuma longa*) and its major constituent (curcumin) as nontoxic and safe substances: Review No Title. *J Ilm Kesehat Promot* 2021;53.
18. Jayakar DBB. Turmeric: A Herbal and Traditional Medicine. 2008. Available from: [file:///C:/Users/ASUS/Downloads/Turmeric_A_Herbal_and_Traditional_Medicine \(1\).pdf](file:///C:/Users/ASUS/Downloads/Turmeric_A_Herbal_and_Traditional_Medicine%20(1).pdf)
19. Thejaswini S, Pattan DN. Composition and Health Benefits of Turmeric (*Curcuma longa*). *Int J Res Appl Sci Eng Technol* 2022;10:658-70.
20. Mohammadi A, Khanbabaei H, Zandi F, et al. Curcumin: A therapeutic strategy for targeting the Helicobacter pylori-related diseases. *Microb Pathog* 2022;166.
21. Kim DC, Kim SH, Choi BH, et al. Curcuma longa extract protects against gastric ulcers by blocking H2 histamine receptors. *Biol Pharm Bull* 2005;28:2220-4.
22. Santos AM, Lopes T, Oleastro M, et al. Curcumin inhibits gastric inflammation induced by Helicobacter pylori infection in a mouse model. *Nutrients* 2015;7:306-20.
23. Nugraha MIA, Erna Harfiani AP. Systematic Review: Potensi Kurkumin Dalam Rimpang Kunyit (*Curcuma longa* Linn) Sebagai Anti-Inflamasi Pada Gastritis Akibat Infeksi Helicobacter Pylori. *Med J* 2022;3:2069.
24. Nasser GA. Kunyit sebagai agen anti inflamasi. *Wellness Heal Mag* 2022;2. Available from: <file:///C:/Users/ASUS/Downloads/79-230-1-PB.pdf>
25. Rudrappa GH, Chakravarthi PT, Benny IR. Efficacy of high-dissolution turmeric-sesame formulation for pain relief in adult subjects with acute musculoskeletal pain compared to acetaminophen: A randomized controlled study. *Medicine (Baltimore)* 2020;99:e20373.
26. Kessaratikoon P, Ninsalai K, Ruthairat Boonkroongcheep NC. Measurement and Analysis of Specific Activities of Natural and Anthropogenic Radionuclides in Fresh Turmeric (*Curcuma longa* L.) from Lan Khoi Sub-district, Pa Phayom District. *Phatthalung*. 2022;22.
27. Yang TC, Lee K-Y, Gul K, et al. Phenolics and antioxidant activity of aqueous turmeric extracts as affected by heating temperature and time. *LWT* 2019;105:149-155.
28. Santos AM, Lopes T, Oleastro M, et al. Curcumin Inhibits Gastric Inflammation Induced by Helicobacter Pylori Infection in a Mouse Model. *Nutrients* 2015;7:306-20.
29. Razavi BM, Ghasemzadeh Rahbardar M, Hosseinzadeh H. A review of therapeutic potentials of turmeric (*Curcuma longa*) and its active constituent, curcumin, on inflammatory disorders, pain, and their related patents. *Phytother Res* 2021;35: 6489-6513.
30. Zebib B, Mouloungui Z, Noirot V. Stabilization of curcumin by complexation with divalent cations in glycerol/water system. *Bioinorg Chem Appl*. 2010;2010:292760.
31. Ratnasari BD, Aini DM. Pengaruh Suhu Dekoksi Terhadap Kadar Kurkumin dan Aktivitas Antioksidan pada Rimpang Temulawak (*Curcuma Zanthorrhiza*). *J Pharm Heal Res* 2023; 4:40-5.
32. Valentina D. No Hubungan Pola Makan dengan Kejadian Gastritis di Kabupaten Tana Toraja Tahun 2021. *J Ilm Kesehat Promot* 2021;6:53.
33. Koosirirat C, Linpisarn S, Changsom D, et al. Investigation of the anti-inflammatory effect of *Curcuma longa* in Helicobacter pylori-infected patients. *Int Immunopharmacol* 2010;10:815-8.