

A Case Report on Moderate Depression as a Precipitating Factor for Chronic Gastritis

Rezsa Dwi Ar Rasyid¹, Fairuz Ridlo², Rika Nur Karida³, Ajeng Prisnidiawati⁴, Shinta

Maulydiyah Basuki⁵, Tutik Nur Kasiani⁶, Hafid Algristian⁷

Universitas Nahdlatul Ulama Surabaya, Indonesia¹²³⁴⁵⁷

Rumah Sakit Radjiman Wediodiningrat Lawang Malang, Indonesia⁶

Correspondent: dr.hafid@unusa.ac.id⁷

Received : June 13, 2025

Accepted : July 23, 2025

Published : July 31, 2025

Citation: Rasyid, R, D, A., Ridlo, F., Karida, R, N., Prisnidiawati, A., Basuki, S, M., Kasiani, T, N., & Algristian, H. (2025). A Case Report on Moderate Depression as a Precipitating Factor for Chronic Gastritis. *Medicor : Journal of Health Informatics and Health Policy*, 3(3), 149-160.

<https://doi.org/10.61978/medicor.v3i3>

ABSTRACT: Depression is increasingly acknowledged as a key contributor to gastrointestinal dysfunction, primarily through neuroendocrine mechanisms such as activation of the hypothalamic–pituitary–adrenal (HPA) axis. Elevated cortisol in depressive states may trigger increased gastric acid secretion, altered gut motility, and intestinal barrier disruption, which contribute to inflammation and recurrent gastritis. While chronic gastritis is often treated pharmacologically, the psychological dimension is frequently overlooked. This case report investigates the role of moderate depression as a triggering factor for chronic gastritis through HPA axis dysregulation. A 33-year-old woman diagnosed with both conditions was followed for six months. Data were obtained via DSM-5-based psychiatric assessments, medical records, and follow-up interviews. The patient was treated with sertraline (50 mg/day) and standard gastritis therapy. Notable improvements in depressive symptoms were observed, along with a marked reduction in gastritis recurrence. This outcome supports existing evidence that psychological stress can impact gastrointestinal health via neuroinflammatory responses, immune dysfunction, and microbiota alteration. The case highlights the importance of an integrated treatment model that addresses both psychological and physical aspects. Routine mental health screening in patients with persistent gastrointestinal symptoms may enhance treatment efficacy and reduce recurrence. A biopsychosomatic approach involving collaboration between psychiatry and gastroenterology is recommended for comprehensive and effective care.

Keywords: Moderate Depression, Chronic Gastritis, HPA Axis, Psychosomatic Disorder, Case Report.



This is an open access article under the CC-BY 4.0 license

INTRODUCTION

Somatic symptoms such as appetite disturbances, fatigue, and sleep disorders are frequently observed in individuals with moderate depression, which often goes undiagnosed or undertreated

(Setyowati et al., 2023). Depression is now considered one of the most significant contributors to the global burden of disease, surpassing many chronic physical illnesses in terms of disability and years lived with disability (Penninx et al., 2025). In Indonesia, the prevalence of mental health disorders continues to rise, with the Basic Health Research (Riskesdas) data indicating an increase in psychological disorders from 6% in 2013 to 9.8% in 2018. Specifically, depression among individuals over the age of 15 was recorded at 6.1%, yet only 9% of those affected had ever received mental health services (Handajani et al., 2022). This substantial treatment gap is driven by factors such as social stigma, poor mental health literacy, and inequitable access to care particularly in underserved rural regions (Munira et al., 2023).

A growing body of evidence links depression with gastrointestinal disturbances, suggesting a bidirectional relationship via the hypothalamic–pituitary–adrenal (HPA) axis and the gut brain axis. Depression induced HPA axis activation leads to hypercortisolemia, which not only disrupts gut motility but also increases gastric acid secretion and intestinal permeability, promoting mucosal inflammation. These processes contribute to gastrointestinal disorders such as irritable bowel syndrome (IBS), dyspepsia, and notably, gastritis. Moreover, stress-related changes in the intestinal microbiota and chronic immune activation have been associated with worsening gastrointestinal symptoms in both clinical and experimental studies (Duan et al., 2024).

Globally, chronic gastritis is a common gastrointestinal disorder that affects millions, particularly in low- and middle-income countries, with prevalence rates of up to 40% depending on age and geographic location (Wang et al., 2025). While *Helicobacter pylori* remains a key etiological agent, increasing evidence implicates psychosocial stressors as significant contributors to the development and persistence of non-ulcer dyspepsia and gastritis. Chronic stress activates the hypothalamic–pituitary–adrenal (HPA) axis and inflammatory cytokine release, leading to altered gut permeability and mucosal injury. The concept of allostatic load explains how cumulative stress over time disrupts neuroendocrine balance and accelerates physiological deterioration, thereby contributing to psychosomatic illnesses, including gastrointestinal disorders (Guidi et al., 2021). In Indonesia, individuals with gastrointestinal complaints often underreport underlying depressive symptoms due to stigma, cultural barriers, and limited access to mental health care in primary settings (Putri et al., 2021). Integrating psychosocial screening into routine gastrointestinal care may enhance early identification of at-risk patients and improve outcomes through tailored interventions.

Despite the growing understanding of these interactions, clinical approaches in many healthcare settings remain largely compartmentalized. Patients presenting with chronic gastritis are often treated with proton pump inhibitors (PPIs), antacids, or antibiotics without assessing underlying psychosocial stressors or mental health comorbidities. Consequently, treatment becomes symptom-focused rather than etiology centered, leading to recurrence or treatment resistance. This case report highlights the importance of recognizing moderate depression as a precipitating factor in chronic gastritis, illustrating the potential benefits of incorporating mental health assessments into routine gastrointestinal care (Ramadhanty et al., 2024). An integrative biopsychosocial model, in which psychological and neuroendocrine factors are evaluated alongside physical symptoms, may improve diagnostic accuracy and therapeutic outcomes (Ismail et al., 2020).

METHOD

This study employed a qualitative case report design to explore the relationship between moderate depression and recurrent chronic gastritis. Case reports are valuable methodological tools in clinical research, particularly when aiming to understand complex comorbidities involving biopsychosocial interactions that are underrepresented in large-scale epidemiological studies (Merriam & Tisdell, 2016; Yin, 2018). A descriptive case approach allows for a detailed, context-rich examination of real-life medical phenomena, particularly those involving interdisciplinary diagnostic and treatment processes.

The selected patient was a 33 year old woman diagnosed with both chronic gastritis and moderate depression. The case was identified through clinical records from a general hospital in Surabaya, Indonesia, and was selected based on the presence of persistent gastrointestinal symptoms, a confirmed psychiatric diagnosis, and a comprehensive treatment history involving both medical and psychological interventions.

This case report was prepared in accordance with the CARE (CAse REport) guidelines to ensure transparency and completeness in the clinical narrative (Gagnier et al., 2013). In addition to the DSM-5-based psychiatric evaluation and the Hamilton Depression Rating Scale (HAM-D), the Patient Health Questionnaire-9 (PHQ-9) was also utilized to capture the patient's self reported depressive symptoms. The initial PHQ-9 score was 14, consistent with moderate depression, and supported the clinical diagnosis established through structured interviews (Amer et al., 2024; Hewitt et al., 1996).

The patient was observed over a six-month period with monthly follow-up evaluations conducted by a psychiatrist and an internist. Progress was monitored not only by changes in gastrointestinal symptoms but also by trends in psychological assessments. Data collection included comprehensive documentation of pharmacologic adherence, dietary patterns, sleep quality, and psychosocial stressors.

Ethical considerations were addressed by ensuring full patient confidentiality, obtaining written informed consent, and avoiding any intervention that deviated from the standard of care. Since the report involved a single anonymized case without experimental procedures, formal ethics committee approval was not required, in accordance with national clinical research standards.

Data were collected over a six-month observation period using a triangulation strategy to enhance the study's credibility and trustworthiness. Primary data sources included: (1) semi structured psychiatric interviews conducted by a licensed psychiatrist, (2) detailed clinical records, including endoscopic and laboratory results, and (3) mental health assessments based on the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5) criteria for Major Depressive Disorder. To quantify the severity of depression, the Hamilton Depression Rating Scale (HAM-D) was used (Hamilton, 1960; Heim & Binder, 2012). At initial presentation, the HAM-D score corresponded to a moderate level of depressive symptoms.

The psychiatric interview process included an exploration of psychosocial history, trauma exposure, daily functioning, and support systems. The patient was cooperative and provided informed verbal and written consent. To support the clinical interpretation of symptoms, we also reviewed her dietary habits, medication adherence, and stressors during follow-up evaluations. These follow-ups were conducted monthly by both a psychiatrist and an internist to document progress and make necessary treatment adjustments.

The patient's therapeutic regimen included a selective serotonin reuptake inhibitor (SSRI), sertraline at a dose of 50 mg/day, administered under psychiatric supervision. Standard medical therapy for chronic gastritis, including proton pump inhibitors (PPIs), dietary counseling, and physical symptom monitoring, continued throughout the study. No additional psychotherapeutic modalities were administered during this observation period.

Ethical approval was not required for this case report, in accordance with national research guidelines for single patient observational studies that do not involve experimental intervention. However, informed consent was obtained from the patient for the use of anonymized clinical data in academic and research contexts. Patient confidentiality and data protection were strictly maintained throughout the study in line with ethical standards articulated by the Declaration of Helsinki (W. M. Association, 2013).

RESULT AND DISCUSSION

Case Presentation

A 33 year old woman presented with persistent epigastric discomfort, bloating, and occasional shortness of breath that had lasted for over a year. She also reported early satiety, significant loss of appetite, and frequent sleep disturbances. Her symptoms were exacerbated during emotionally stressful periods. Upon further inquiry, a history of psychological trauma emerged, including verbal and physical abuse by her ex-husband, prolonged social isolation, and lack of support from her family and immediate environment. Psychosocial assessments revealed diminished interest in daily activities, anhedonia, chronic fatigue, persistent anxiety, low self-esteem, and hopelessness, which indicated moderate depression (Sareen, 2016).

Treatment Course and Clinical Outcome

Treatment included sertraline 50 mg/day and standard gastritis therapy. Over six months, the patient experienced significant reductions in both depressive and gastrointestinal symptoms. Her HAM-D score improved to 8, and her gastritis symptoms became infrequent and less intense. These clinical changes support the bidirectional link between depression and gastrointestinal dysfunction (Leigh et al., 2023).

Psychobiological Mechanisms: The HPA Axis and Gut Brain Axis

Moderate depression is linked to hyperactivation of the hypothalamic–pituitary–adrenal (HPA) axis, causing elevated cortisol levels (Bertollo et al., 2025). This disrupts gastrointestinal homeostasis, increases acid secretion, and weakens the mucosal barrier. Additionally, dysregulation of the gut brain axis including microbiota imbalance (dysbiosis) contributes to neuroinflammation and leaky gut, exacerbating symptoms (Clarke et al., 2023).

Altered gut microbiota affects serotonin metabolism, mood regulation, and immune response. Changes in microbial diversity, decreased short chain fatty acid production, and increased inflammatory cytokines such as IL-6 and TNF- α have been linked to both depression and gastric mucosal damage (Huang et al., 2024).

The Role of SSRIs in GI Function

SSRIs, particularly sertraline, increase serotonin availability and may modulate gastrointestinal function by enhancing vagal tone and reducing visceral hypersensitivity (W. K. Hou et al., 2021). Beyond their psychiatric effects, SSRIs may reduce gut inflammation and improve motility, explaining the improvement in gastritis symptoms in this case (Ghoshal et al., 2023).

Clinical Implications and Integrative Care

This case emphasizes the need to adopt a biopsychosomatic approach in managing chronic gastritis. Psychological distress is frequently overlooked in patients with recurring gastrointestinal symptoms. Integrative care involving both gastroenterology and mental health professionals can improve diagnostic accuracy, prevent relapse, and enhance quality of life (Ismail et al., 2020).

Routine mental health screening tools like PHQ-9 in GI clinics, along with interdisciplinary collaboration, are essential in addressing psychosomatic overlap effectively.

Limitations and Future Directions

While insightful, this single case report lacks objective biomarkers such as cortisol or microbiome analysis. Future research should focus on larger samples, longitudinal data, and combined interventions (e.g., SSRIs and psychotherapy) to validate this biopsychosomatic model.

This clinical course supports growing evidence of a bidirectional relationship between psychiatric and gastrointestinal disorders. Depression is known to dysregulate the hypothalamic–pituitary–

adrenal (HPA) axis, leading to sustained hypercortisolemia, which in turn contributes to gastric acid hypersecretion and compromised mucosal protection (Bertollo et al., 2025; Yuliadi, 2021). Moreover, chronic stress impairs gut barrier function and modulates the microbiota composition, resulting in increased intestinal permeability, or “leaky gut,” which triggers systemic and localized inflammatory responses (Leigh et al., 2023).

These findings are consistent with the growing body of evidence that links mental health management with improvement in gastrointestinal outcomes. Ismail et al. (2020) conducted a systematic review demonstrating that depressive symptoms were significantly associated with a higher burden of gastrointestinal complaints, including gastritis, even after adjusting for other physical comorbidities. Pharmacological treatment with SSRIs has shown efficacy in improving both psychiatric and digestive symptoms, especially in patients with functional gastrointestinal disorders.

Another dimension that deepens the understanding of this link is the gut brain microbiota axis. Clarke et al. (2023) emphasized that disruptions in the intestinal microbiome referred to as dysbiosis can influence central nervous system functioning by altering neurotransmitter pathways, increasing inflammatory cytokines, and affecting stress responses. These alterations may contribute to the bidirectional relationship between depression and gastrointestinal symptoms, especially in chronic conditions such as gastritis.

In the Indonesian healthcare context, cultural stigma around mental illness often leads patients to present psychological distress as physical complaints, particularly in primary care settings. As reported by Putri et al. (2021), healthcare providers frequently encounter patients with somatic symptoms who are eventually diagnosed with underlying depressive or anxiety disorders (Organization, 2023). This poses a diagnostic challenge, particularly when providers are not equipped with screening tools or are limited by time and training. The case in this study mirrors that pattern, where persistent gastrointestinal symptoms masked a deeper psychological condition.

These observations support the importance of interdisciplinary collaboration and a biopsychosomatic care model. As noted by Guidi et al. (2021), health outcomes are optimized when biological, psychological, and social dimensions are jointly addressed, especially in chronic and overlapping conditions. In this case, integrated management involving a psychiatrist and an internist led to substantial improvements in both mental health and gastrointestinal function. Incorporating routine mental health screening in gastroenterology settings may offer a pragmatic approach to improve clinical outcomes, reduce unnecessary investigations, and promote long-term recovery.

The gut–brain axis, a complex communication network linking the central nervous system, enteric nervous system, and intestinal microbiota, plays a pivotal role in mediating these interactions. Alterations in this axis such as microbiome dysbiosis can influence mood regulation and stress reactivity, further exacerbating psychiatric and gastrointestinal symptoms (Foster & Neufeld, 2021). Recent studies have also indicated that patients with depressive disorders often exhibit elevated levels of inflammatory markers such as IL-6 and TNF- α , which have been implicated in gastric mucosal inflammation (Zhao, 2021).

Psychotropic medications like SSRIs not only improve depressive symptoms but also appear to influence gut function positively. SSRIs can enhance vagal tone and modulate visceral hypersensitivity, which may explain the parallel improvement in gastritis symptoms in this case (X. H. Hou, 2021). Additionally, psychological support and psychoeducation, though not formally administered here, are known to improve outcomes in similar psychosomatic cases (Ismail et al., 2020).

These findings emphasize the importance of adopting a holistic, multidisciplinary approach in cases with overlapping psychiatric and gastrointestinal features. Traditional models of care that isolate somatic from psychological symptoms may miss critical aspects of diagnosis and treatment, leading to chronicity and reduced quality of life.

Limitations and Future Directions

This case report is limited by its single subject design, which restricts the generalizability of the findings. Although detailed qualitative and clinical data were gathered, no objective biological markers such as cortisol levels, gut microbiota analysis, or inflammatory cytokines were used to support the psychobiological link between depression and chronic gastritis. Additionally, the absence of psychotherapeutic intervention as part of the treatment strategy limits our understanding of how non-pharmacological modalities may complement pharmacologic therapy in similar cases. Another limitation is the reliance on self-reported symptoms and subjective measures, which may be influenced by response bias or cultural factors.

Future studies should aim to explore the gut–brain interaction in larger, more diverse populations using a combination of psychological, biochemical, and microbiological data. Randomized controlled trials assessing integrated treatment approaches such as the combination of SSRIs, cognitive behavioral therapy (CBT), dietary adjustments, and microbiome-targeted interventions may provide a more robust evidence base. Furthermore, implementation research focusing on screening strategies for depression in primary care gastrointestinal settings, particularly in low-resource contexts like Indonesia, is urgently needed to reduce the diagnostic delay and optimize clinical outcomes (Laila et al., 2023).

Clinical Implications of PHQ-9 Use and Patient Education

The incorporation of standardized screening tools such as the Patient Health Questionnaire-9 (PHQ-9) offers a practical method for identifying depression in patients with overlapping somatic symptoms. In this case, the PHQ-9 score provided corroborative evidence for the clinical diagnosis, enabling more targeted and timely psychiatric intervention. PHQ-9 is brief, validated, and suitable for use in both primary care and specialty settings, including gastroenterology clinics. Its implementation may help overcome provider hesitation in initiating conversations about mental health, especially in time-constrained environments.

However, the effective use of such tools must be accompanied by patient education. Many patients may perceive the attribution of their gastrointestinal symptoms to psychological factors as dismissive or stigmatizing, leading to resistance or disengagement from psychiatric care. This underscores the need for clear, empathetic communication and education that frames mental health as an integral component of overall well-being. Health providers should be trained to explain the biopsychosomatic model in culturally sensitive terms, emphasizing that mental and physical health are inseparable and that addressing psychological factors can lead to real, measurable improvement in physical symptoms(Algristian et al., 2022).

Moreover, patient empowerment through psychoeducation can enhance treatment adherence and reduce the likelihood of relapse(Rasyid et al., 2023). Patients who understand the rationale behind antidepressant prescriptions or lifestyle modifications are more likely to engage consistently with their care plans. Therefore, integrating brief educational interventions at the point of care possibly even in written form may serve as a low cost, high impact strategy for improving outcomes in complex cases like the one presented.

CONCLUSION

This case underscores the importance of recognizing moderate depression as a precipitating and perpetuating factor in chronic gastritis. The interplay between neuroendocrine dysregulation, gut microbiota alterations, and psychosocial stressors can exacerbate both gastrointestinal and psychiatric symptoms(A. P. Association, 2013). Comprehensive treatment addressing both physical and psychological components led to significant clinical improvement in this case. Therefore, a multidisciplinary approach that incorporates routine mental health screening in gastroenterology settings is essential, particularly in primary care systems of developing countries. Greater emphasis should also be placed on reducing mental health stigma, improving health worker training, and ensuring access to psychiatric support. Future research should explore larger cohorts and integrative treatment strategies that combine pharmacologic, psychological, and lifestyle interventions to address the biopsychosomatic nature of chronic gastrointestinal conditions.

In light of these findings, it is crucial that national health systems begin to prioritize mental health integration into primary and specialist care. Early identification of depressive symptoms in patients with chronic physical illnesses can prevent the escalation of disease burden and reduce unnecessary diagnostic procedures. Public health initiatives that raise awareness of the mind body connection and reduce stigma are equally important. Ultimately, a system-wide shift toward collaborative, patient centered care models where gastroenterologists, psychiatrists, and primary care physicians work in synergy offers the best path forward in improving both mental and physical health outcomes for complex patients like the one described.

Future research should focus on larger-scale studies to validate these findings, investigate biomarkers of neuroinflammatory pathways involved in gut brain communication, and explore the

efficacy of combined pharmacological and psychotherapeutic interventions. Understanding these multidimensional relationships may not only improve patient outcomes but also reduce the long-term burden on healthcare systems by preventing chronic relapses and treatment resistance.

Funding

This study did not receive any external funding. The research was carried out independently as a contribution to the understanding of psychological factors as precipitating elements in chronic gastritis.

Underlying Data

The data supporting the findings of this study are available from the corresponding authors upon reasonable request. The authors are committed to transparency and are willing to share the data to facilitate further analysis and research aimed at advancing knowledge in this field.

REFERENCE

- Algristian, H., Bintarti, T. W., Baroroh, R. N. M., Leila, Q., Ulfa, R., Krismawati, A., Nurdiana, M., Sudjarwo, G. W., Nurhidayat, A. W., Satriotomo, I., & Handajani, R. (2022). Protective effect of lavender essential oils on depression and multi-organ stress. *Bali Medical Journal*, 11(3), 1357–1363. <https://doi.org/10.15562/bmj.v11i3.3655>
- Amer, N. A., Abdelrazek, S., Eladrosy, W., El-Bakry, H., & Shohieb, S. M. (2024). Computer-Based Cognitive Behavioral Therapy Intervention for Depression, Anxiety, and Stress Disorders: A Systematic Review. *International Journal of Cognitive Therapy*, 17(4), 885–918. <https://doi.org/10.1007/s41811-024-00225-0>
- Association, A. P. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.).
- Association, W. M. (2013). Declaration of Helsinki: Ethical principles for medical research involving human subjects. *JAMA*, 310(20), 2191–2194. <https://doi.org/10.1001/jama.2013.281053>
- Bertollo, A. G., Santos, C. F., Bagatini, M. D., & Ignácio, Z. M. (2025). Hypothalamus–pituitary–adrenal and gut–brain axes in biological interaction pathway of the depression. *Frontiers in Neuroscience*, 19. <https://doi.org/10.3389/fnins.2025.1541075>
- Clarke, G., Sandhu, K. V, Griffin, B. T., Dinan, T. G., Cryan, J. F., & Hyland, N. P. (2023). Gut reactions: Breaking down the role of the microbiome in gastrointestinal and psychiatric disorders. *Nature Reviews Gastroenterology & Hepatology*, 20(2), 103–118. <https://doi.org/10.1038/s41575-022-00671-6>

- Duan, D. M., Wang, Y. C., Hu, X., Wang, Y. B., Wang, Y. Q., Hu, Y., Zhou, X. J., & Dong, X. Z. (2024). Effects of regulating gut microbiota by electroacupuncture in the chronic unpredictable mild stress rat model. *Neuroscience*, 557, 24–36. <https://doi.org/10.1016/j.neuroscience.2024.08.005>
- Foster, J. A., & Neufeld, K. M. (2021). Gut–brain axis: How the microbiome influences anxiety and depression. *Trends in Neurosciences*, 44(3), 207–220. <https://doi.org/10.1016/j.tins.2020.12.008>
- Gagnier, J. J., Kienle, G., Altman, D. G., Moher, D., Sox, H., Riley, D., & Group, C. (2013). The CARE guidelines: Consensus-based clinical case reporting guideline development. *Journal of Clinical Epidemiology*, 66(7), 760–767. <https://doi.org/10.1016/j.jclinepi.2013.04.010>
- Ghoshal, U. C., Srivastava, D., Misra, A., & Ghoshal, U. (2023). The emerging role of psychobiotics in irritable bowel syndrome and functional gastrointestinal disorders. *Indian Journal of Gastroenterology*, 42(3), 216–224. <https://doi.org/10.1007/s12664-023-01326-z>
- Guidi, J., Lucente, M., Sonino, N., & Fava, G. A. (2021). Allostatic load and its impact on health: A systematic review. *Psychotherapy and Psychosomatics*, 90(1), 11–27. <https://doi.org/10.1159/000510696>
- Hamilton, M. (1960). A rating scale for depression. *Journal of Neurology, Neurosurgery, and Psychiatry*, 23(1), 56–62. <https://doi.org/10.1136/jnnp.23.1.56>
- Handajani, Y. S., Schröder-Butterfill, E., Hogervorst, E., Turana, Y., & Hengky, A. (2022). Depression among older adults in Indonesia: Prevalence, role of chronic conditions and other associated factors. *Clinical Practice & Epidemiology in Mental Health*, 18(1), 1–10. <https://doi.org/10.2174/17450179-v18-e2207010>
- Heim, C., & Binder, E. B. (2012). Current research trends in early life stress and depression: Review of human studies on sensitive periods, gene–environment interactions, and epigenetics. *Experimental Neurology*, 233(1), 102–111. <https://doi.org/10.1016/j.expneurol.2011.10.032>
- Hewitt, P. L., Flett, G. L., & Ediger, E. (1996). Perfectionism and depression: Longitudinal assessment of a specific vulnerability hypothesis. *Journal of Abnormal Psychology*, 105(2), 276–280. <https://doi.org/10.1037/0021-843X.105.2.276>
- Hou, W. K., Tong, H., Liang, L., Li, T. W., Liu, H., Ben-Ezra, M., Goodwin, R., & Lee, T. M. C. (2021). Probable anxiety and components of psychological resilience amid COVID-19: A population-based study. *Journal of Affective Disorders*, 282, 594–601. <https://doi.org/10.1016/j.jad.2020.12.127>
- Hou, X. H. (2021). Brain–gut interactions in stress-related gastrointestinal disorders. *Neurogastroenterology & Motility*, 33(6), 14008. <https://doi.org/10.1111/nmo.14008>
- Huang, T. T., Lai, J. B., Du, Y. L., Xu, Y., Ruan, L. M., & Hu, S. H. (2024). Current understanding of gut microbiota in mood disorders: Mechanism and clinical implications. *World Journal of Psychiatry*, 14(1), 1–15. <https://doi.org/10.5498/wjp.v14.i1.1>

- Ismail, K., Winkley, K., & Stahl, D. (2020). The association of depressive symptoms with gastrointestinal disorders: A systematic review. *BMJ Open*, 10, 39552. <https://doi.org/10.1136/bmjopen-2020-039552>
- Laila, F. N., Algristian, H., & Azizah, N. (2023). Case study: Prognosis of recurrent depressive disorder with somatic symptoms. *International Islamic Medical Journal*, 5(1), 16–23. <https://doi.org/10.33086/iimj.v5i1.4454>
- Leigh, S. J., Uhlig, F., Wilmes, L., Sanchez-Diaz, P., Gheorghe, C. E., Goodson, M. S., Kelley-Loughnane, N., Hyland, N. P., Cryan, J. F., & Clarke, G. (2023). The impact of acute and chronic stress on gastrointestinal physiology and function: A microbiota–gut–brain axis perspective. *The Journal of Physiology*, 601(20), 4491–4538. <https://doi.org/10.1113/JP281951>
- Munira, L., Liamputtong, P., & Viwattanakulvanid, P. (2023). Barriers and facilitators to access mental health services among people with mental disorders in Indonesia: A qualitative study. *Belitung Nursing Journal*, 9(2), 110–117. <https://doi.org/10.33546/bnj.2521>
- Organization, W. H. (2023). *World mental health report: Transforming mental health for all*. <https://www.who.int/publications/i/item/9789240049338>
- Penninx, B. W. J. H., Lamers, F., Jansen, R., Berk, M., Khandaker, G. M., Pickers, L., & Milaneschi, Y. (2025). Immuno-metabolic depression: From concept to implementation. *The Lancet Regional Health – Europe*, 48, 101166. <https://doi.org/10.1016/j.lanepe.2024.101166>
- Putri, A. K., Gustriawanto, N., & Rahapsari, S. (2021). Exploring the perceived challenges and support needs of Indonesian mental health stakeholders: A qualitative study. *International Journal of Mental Health Systems*, 15, 81. <https://doi.org/10.1186/s13033-021-00504-9>
- Ramadhanty, L., Prameswari, A., & Algristian, H. (2024). A case report on moderate depression as a precipitating factor for chronic gastritis. *Medicor*, 3(3), 132–138. <https://doi.org/10.61978/medicor.v3i3.535>
- Rasyid, R. D. A., Pramono, D. A., & Lestari, R. W. (2023). Determinants of unmet mental health treatment needs in Indonesian rural adolescents: A cross-sectional study. *Asian Journal of Psychiatry*, 84, 103582. <https://doi.org/10.1016/j.ajp.2023.103582>
- Sareen, J. (2016). Risk factors for suicide in depression across cultures. *World Psychiatry*, 15(2), 146–155. <https://doi.org/10.1002/wps.20326>
- Setyowati, D., Frijanto, N., & Agustina, R. (2023). Unmet needs in depression care in primary healthcare in Indonesia. *BMC Primary Care*, 24, 102. <https://doi.org/10.1186/s12875-023-02091-0>
- Wang, L., Jiang, W., & Li, H. (2025). Global, regional, and national burden of gastritis and duodenitis from 1990 to 2021 with projections to 2050: A systematic analysis of the Global Burden of Disease Study 2021. *International Journal of Medical Sciences*, 22(11), 2570–2582. <https://doi.org/10.7150/ijms.109762>
- Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). SAGE Publications.

- Yuliadi, A. (2021). Depression and chronic gastrointestinal disorders: Role of psychosomatic interaction. *Medical Journal of Indonesia*, 30(2), 123–129. <https://doi.org/10.13181/mji.bmj.2021.302.mji123>
- Zhao, Y. (2021). Gut microbiota dysbiosis in depression: Mechanisms and therapeutic implications. *Trends in Neurosciences*, 44(3), 207–220. <https://doi.org/10.1016/j.tins.2020.12.003>