International Journal of Sciences and Innovation Engineering
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
website: ***www.ijsci.com***
Volume 03, Issue 10, October 2026
E-ISSN : 3049-0251
DOI: https://doi.org/10.70849/ijsci03102610122

The relationship between irritant food and beverage consumption and functional dyspepsia severity among outpatients at Maesaan Primary Health Center, Indonesia

Natalivi Timporok[1], Deviana P. Munthe[2], Alva Supit[3], Vera D. Tombokan[4], Rakhmawati Agustina[5], Theo Mautang[6]

[1,2,3,4,5,6] *Public Health Department, Faculty of Sports Science and Public Health, Universitas Negeri Manado, North Sulawesi, Indonesia*

Article Info

Article History:

Published: 06 Oct 2026

Publication Issue:
Volume 03, Issue 10
October 2026

Page Number:
239-244

Corresponding Author:
Natalivi Timporok

Abstract:

Functional dyspepsia is a common gastrointestinal disorder in primary care, and the consumption of irritant foods and beverages is suspected to aggravate its symptoms. This study analyzed the relationship between irritant food consumption (X1) and irritant beverage consumption (X2) and the severity of functional dyspepsia (Y) among outpatients at Maesaan Primary Health Center. A correlational analytic design with a cross-sectional approach was used on 80 respondents diagnosed with ICD-10 code K30, selected by simple random sampling from E-Puskesmas data covering January–March 2026. Irritant consumption was measured with a simple Food Frequency Questionnaire (FFQ) and severity with the Porto Alegre Dyspeptic Symptoms Questionnaire (PADYQ). Data were analyzed using the Spearman Rank correlation test. Of the respondents, 35.0% had a high level of irritant consumption and 35.0% had severe dyspepsia. Irritant food consumption showed a strong positive correlation ($\rho = 0.782$; $p = 0.000$), while irritant beverage consumption showed a very strong positive correlation ($\rho = 0.815$; $p = 0.000$). Higher consumption of irritant foods and beverages is associated with greater severity of functional dyspepsia.

Keywords: functional dyspepsia, irritant food, irritant beverage, severity, Spearman correlation

1. Introduction

Dyspepsia, commonly referred to by laypeople as “maag” (heartburn or stomach ache), is a cluster of complaints consisting of pain or discomfort in the upper abdomen, nausea, vomiting, bloating, early satiety, and postprandial fullness. Medically, these complaints are classified as functional dyspepsia, which is frequently encountered in both primary and specialist health care and affects the quality of life and productivity of those affected. The global prevalence of functional dyspepsia based on the Rome IV criteria is 8.4% in the adult population (Sperber et al., 2021), while in Asia it has been reported to reach 43–79.5% (Firmansyah et al., 2022).

In North Sulawesi, dyspepsia ranked first among outpatient diseases from January to March 2024 at Bhayangkara Level III Hospital in Manado with 1,219 cases (Pattipeilohy, 2024), and ranked second among outpatient diseases at Mitra Sehat Regional Hospital throughout 2024 (Lumopa et al., 2025). At the district level, Maesaan Primary Health Center ranked third in dyspepsia cases in South Minahasa with 933 cases in 2025 (Dinas Kesehatan Kabupaten Minahasa Selatan, 2025). E-Puskesmas data also show a rising trend from 821 cases (2023) to 913 cases (2024) and 933 cases (2025).

The causes of functional dyspepsia are multifactorial, including irregular eating patterns, disturbed gastric acid secretion, impaired gastric motility, visceral hypersensitivity, *Helicobacter pylori* infection, and psychological factors. The consumption of irritant foods and beverages is a modifiable factor because it can stimulate gastric acid production and irritate the mucosa (Handayani et al., 2021). Associations of coffee, spicy food, and sour food consumption with

Copyright © 2026 The Author(s). CC BY 4.0 (https://creativecommons.org/licenses/by/4.0/)

dyspepsia have been reported at Oesao Primary Health Center in Kupang (Ndun et al., 2024), and an association between spicy food consumption and dyspepsia has been reported among adolescents (Erlinda et al., 2025).

However, these studies generally assessed only the presence or absence of dyspepsia and did not assess symptom severity, which is more relevant to treatment decisions in primary care. This study aims to analyze the relationship between irritant food consumption and irritant beverage consumption, analyzed separately, and the severity of functional dyspepsia among outpatients at Maesaan Primary Health Center based on E-Puskesmas data.

2. Literature Review

Functional dyspepsia is characterized by epigastric pain, nausea, vomiting, bloating, and early satiety without demonstrable organic abnormalities. Its severity can be measured with the Porto Alegre Dyspeptic Symptoms Questionnaire (PADYQ), developed by Sander et al. (2004) on the basis of the Rome I criteria to assess the intensity, duration, and frequency of the five main dyspeptic symptoms over the previous 30 days. The instrument was chosen because it is more standardized than subjective assessment without a measuring tool.

Irritant foods include spicy, sour, fatty or fried, instant, and sharply spiced foods, while irritant beverages include caffeinated drinks such as coffee and tea, carbonated drinks, and alcoholic beverages (Handayani et al., 2021). Pathophysiologically, capsaicin in spicy food increases visceral sensitivity, caffeine stimulates gastric acid secretion, fat delays gastric emptying, and alcohol can damage the protective mucus layer of the stomach (Handayani et al., 2021; Suhesti et al., 2025). Based on this framework, the hypotheses of this study are that there is a significant relationship between irritant food consumption (X1) and between irritant beverage consumption (X2) and the severity of functional dyspepsia (Y).

3. Methodology

This study used a correlational analytic design with a cross-sectional approach (Notoatmodjo, 2018; Swarjana, 2015) and was conducted in the working area of Maesaan Primary Health Center, South Minahasa Regency, North Sulawesi. The population comprised outpatients diagnosed with functional dyspepsia (ICD-10 code K30) recorded in E-Puskesmas from January to March 2026, totaling 233 people. The minimum sample size calculated with the Slovin formula (10% margin of error) was 70, increased by 10% as a reserve to 77, and then rounded up to 80 respondents. The sample was selected by simple random sampling through a lottery of the serial numbers of patients who met the inclusion criteria.

The inclusion criteria were outpatients recorded in E-Puskesmas with ICD-10 code K30 who visited between January and March 2026, were willing to participate, and were able to communicate and understand the questionnaire. The exclusion criteria were organic dyspepsia, pregnancy, other chronic diseases affecting consumption patterns or symptoms, inability to be contacted, and communication or cognitive impairment.

Irritant food consumption (X1, 24 items) and irritant beverage consumption (X2, 16 items) were measured with a simple FFQ covering the previous 30 days, adapted from Sirajuddin et al. (2018), while the severity of functional dyspepsia (Y) was measured with the PADYQ. All items were valid (calculated r > table r of 0.2199) and reliable, with Cronbach's Alpha of 0.959 (X1), 0.931 (X2), and 0.950 (Y). Irritant consumption was categorized as low (0–666), moderate (667–1333), and high (1334–2000), while severity was categorized as normal (0–5), mild (6–11), moderate (12–22), and severe (23–44).

Univariate analysis was used to describe frequency distributions, and bivariate analysis used the Spearman Rank correlation test because the data were ordinal, with SPSS Statistics version 25. H_0 was rejected when $p \leq 0.05$. The strength of the relationship was interpreted from the correlation coefficient: 0.00–0.19 very weak, 0.20–0.39 weak, 0.40–0.59 moderate, 0.60–0.79 strong, and 0.80–1.00 very strong (Guilford, 1956).

4. Results and Discussion

4.1 Respondent Characteristics

The characteristics of the 80 respondents are presented in Table 1. Most respondents were aged 17–25 years (40.0%), female (52.5%), had a senior high school education (47.5%), and worked as university students or private employees (21.3% each).

Table 1. Respondent Characteristics (N = 80)

Characteristic	Category	n	%
Age	17–25 years	32	40.0
	26–35 years	22	27.5
	36–45 years	16	20.0
	46–55 years	10	12.5
Sex	Male	38	47.5
	Female	42	52.5
Education	Elementary school	6	7.5
	Junior high school	13	16.3
	Senior high school	38	47.5
	Diploma (D3)	8	10.0
	Bachelor's degree (S1)	15	18.8
Occupation	University student	17	21.3
	Private employee	17	21.3
	Farmer	13	16.3
	Entrepreneur	12	15.0
	Housewife	9	11.3
	Civil servant	6	7.5
	Laborer	4	5.0
	School student	2	2.5

Source: Processed primary data (2026)

4.2 Irritant Consumption and Severity of Functional Dyspepsia

The distributions of irritant food and beverage consumption and of functional dyspepsia severity are presented in Table 2. The high consumption category was the largest (35.0%), and 67.5% of respondents were in the moderate to high categories. No respondent fell into the normal category; severe dyspepsia was the most frequent (35.0%), followed by moderate and mild (32.5% each).

Table 2. Distribution of Irritant Consumption and Severity of Functional Dyspepsia (N = 80)

Variable	Category	n	%
Irritant consumption	Low (score 0–666)	26	32.5
	Moderate (score 667–1333)	26	32.5

Variable	Category	n	%
	High (score 1334–2000)	28	35.0
Severity	Normal (score 0–5)	0	0.0
	Mild (score 6–11)	26	32.5
	Moderate (score 12–22)	26	32.5
	Severe (score 23–44)	28	35.0

Source: Processed primary data from the FFQ and PADYQ questionnaires (2026)

4.3 Relationship between Irritant Food and Beverage Consumption and Severity

The results of the Spearman Rank correlation test are presented in Table 3. Irritant food consumption (X1) was significantly related to the severity of functional dyspepsia ($\rho = 0.782$; $p = 0.000$), with a strong and positive relationship. Irritant beverage consumption (X2) was also significantly related ($\rho = 0.815$; $p = 0.000$), with a very strong and positive relationship. Because $p < 0.05$ for both pairs of variables, H_0 was rejected and H_1 was accepted.

Table 3. Results of the Spearman Rank Correlation Test

Correlated variables	Correlation coefficient (ρ)	Sig. (2-tailed)	N	Strength of relationship	Decision
Irritant food consumption (X1) – Severity of functional dyspepsia (Y)	0.782	0.000	80	Strong	H_0 rejected
Irritant beverage consumption (X2) – Severity of functional dyspepsia (Y)	0.815	0.000	80	Very strong	H_0 rejected

Source: SPSS Statistics Version 25 output – Nonparametric Correlations (2026)

4.4 Discussion

The predominance of respondents of productive age is consistent with Suhesti et al. (2025), who stated that adolescents and young adults are vulnerable to functional dyspepsia due to irregular eating patterns, spicy snack consumption, and academic and work pressure, and with Ndun et al. (2024), who found that dyspepsia occurred mostly at ages 15–64 years. The larger proportion of women is in line with the literature that dyspepsia prevalence is higher in women, which is attributed to the influence of estrogen and progesterone on gastrointestinal motility (Sudoyo et al., 2023).

The high irritant consumption among respondents is in line with the consumption patterns of the South Minahasa community, which is fond of spicy food, coffee, and traditional alcoholic beverages such as saguer and cap tikus. This finding is consistent with Saputri et al. (2025), who showed that spicy, sour, and fatty foods and caffeinated beverages are significant risk factors for dyspepsia.

The significant positive relationship of both irritant food and irritant beverage consumption with severity is consistent with Ndun et al. (2024), Erlinda et al. (2025), Ellenczynska and Magdalena (2022), and Rizka et al. (2024), who reported a relationship between coffee consumption and dyspepsia. The difference is that this study used severity as the dependent variable and analyzed irritant foods and beverages separately, thereby obtaining strong to very strong relationships. The slightly stronger relationship for irritant beverages than for irritant foods suggests that liquid irritants such as caffeine, carbonated drinks, and alcohol may exert a faster and more consistent irritating effect on the gastric mucosa than solid foods. Repeated accumulated exposure to irritants may worsen motility disorders and visceral hypersensitivity, thereby increasing symptom severity (Handayani et al., 2021; Suhesti et al., 2025).

The limitations of this study include the cross-sectional design, which cannot explain causal relationships; potential recall bias in the 30-day FFQ; confounding variables such as stress, NSAID use, and *Helicobacter pylori* infection that were not analyzed; and the single study site, so generalization should be made with caution.

5. Conclusion

Irritant food consumption was significantly, positively, and strongly related to the severity of functional dyspepsia ($\rho = 0.782$; $p = 0.000$), and irritant beverage consumption was significantly, positively, and very strongly related to the severity of functional dyspepsia ($\rho = 0.815$; $p = 0.000$) among outpatients at Maesaan Primary Health Center. The higher the consumption of irritant foods and beverages, the more severe the functional dyspepsia. Because irritant consumption is a modifiable risk factor, the health center and health workers are advised to provide dietary education and nutrition counseling adapted to the local culinary culture, especially for patients with moderate to severe dyspepsia. Future studies are advised to use longitudinal or cohort designs and to consider confounding variables.

Funding Details

This research received no specific grant from any funding agency.

Disclosure Statement

The authors declare no financial interest or conflict of interest arising from the direct application of this research.

References

1. Dinas Kesehatan Kabupaten Minahasa Selatan. (2025). *Profil Kesehatan Kabupaten Minahasa Selatan tahun 2025*. Amurang: Dinkes Minsel. [in Indonesian]
2. Ellenczynska, R., & Magdalena. (2022). Hubungan pola makan, konsumsi makanan dan minuman iritatif dengan kejadian dispepsia. *Jurnal Riset Pangan dan Gizi*, 4(2), 1-8. [in Indonesian]
3. Erlinda, M., Wiyono, H., & Arsesiana, A. (2025). Hubungan perilaku mengonsumsi makanan pedas dengan kejadian dispepsia pada siswa(i) kelas XI. *Jurnal Kesehatan Tambusai*, 6(4), 16999-17005. [in Indonesian]
4. Firmansyah, M. S., Manaf, A. A., & The, F. (2022). Hubungan faktor risiko dengan kejadian sindrom dispepsia fungsional pada mahasiswa Fakultas Kedokteran Universitas Khairun. *Medula*, 10(1), 9. https://doi.org/10.46496/medula.v10i1.25877 [in Indonesian]
5. Guilford, J. P. (1956). *Fundamental statistics in psychology and education* (3rd ed.). New York: McGraw-Hill.
6. Handayani, N., Sri, T., & Aji, N. (2021). *Kenali dispepsia & cerdas dalam penanganannya*. Tasikmalaya: Omera Pustaka. [in Indonesian]
7. Lumopa, C. C., Bawiling, N. S., & Sudirham. (2025). Analisis faktor determinan kejadian sindrom dispepsia pada pasien rawat jalan di RSUD Mitra Sehat. *Jurnal Kolaboratif Sains*, 8(10), 6111–6119. [in Indonesian]
8. Ndun, E. A., Purnawan, S., & Tira, D. S. (2024). Faktor risiko kejadian dispepsia pada masyarakat usia 15-64 tahun di Kelurahan Oesao wilayah kerja Puskesmas Oesao. *Jurnal Kesehatan*, 13(1), 37-49. [in Indonesian]
9. Notoatmodjo, S. (2018). *Metodologi penelitian kesehatan* (Edisi revisi). Jakarta: Rineka Cipta. [in Indonesian]
10. Pattipeilohy, V. D. (2024). *Gambaran penyakit dispepsia di Rumah Sakit Bhayangkara Tk. III Manado* [Internship report]. Faculty of Public Health, Universitas Sam Ratulangi. [in Indonesian]
11. Rizka, I. D., Cahyady, E., & Gani, S. W. (2024). Hubungan intensitas mengkonsumsi kopi dan pola makan dengan kejadian dispepsia di poli penyakit dalam RSUD Meuraxa. *Jurnal Ilmiah Kedokteran*. [in Indonesian]
12. Sander, G. B., Mazzoleni, L. E., Francesconi, C. F., et al. (2004). Development and validation of a cross-cultural questionnaire to evaluate nonulcer dyspepsia: the Porto Alegre Dyspeptic Symptoms Questionnaire (PADYQ). *Digestive Diseases and Sciences*, 49(11-12), 1822-1829.
13. Saputri, S. A., Indriani, N., & Kresnapati, I. N. B. A. (2025). Analisis kejadian dispepsia terhadap faktor pemicu. *BIOCITY Journal of Pharmacy Bioscience and Clinical Community*, 3(2), 69-84. [in Indonesian]
14. Sirajuddin, Surmita, & Astuti, T. (2018). *Survey konsumsi pangan*. Jakarta: Penerbit Buku Kedokteran EGC. [in

Indonesian]

15. Sperber, A. D., Bangdiwala, S. I., Drossman, D. A., Ghoshal, U. C., Simren, M., Tack, J., ... & Palsson, O. S. (2021). Worldwide prevalence and burden of functional gastrointestinal disorders, results of Rome Foundation global study. *Gastroenterology*, 160(1), 99-114.
16. Sudoyo, A. W., Setiyohadi, B., Alwi, I., Simadibrata, M., & Setiati, S. (2023). *Buku ajar ilmu penyakit dalam* (Edisi 7). Jakarta: Interna Publishing. [in Indonesian]
17. Suhesti, D. B. C., Zoraya, S. I., Leonaviri, M., & Ruqayyah, S. (2025). Hubungan stres, aktivitas fisik, dan jenis makanan dan minuman iritatif dengan kejadian dispepsia fungsional pada remaja di panti asuhan Kecamatan Ampenan. *Jurnal Kedokteran*. [in Indonesian]
18. Swarjana, I. K. (2015). *Metodologi penelitian kesehatan*. Yogyakarta: Andi Offset. [in Indonesian]