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Research Paper

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Analysis of Prescribing Patterns and Therapy Costs in Dyspepsia Patients at Klinik Pratama Soedirman

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Abstract

Background: The prevalence of dyspepsia in Indonesia is estimated at 40-50%. Klinik Pratama Soedirman is a first-level health facility with dyspepsia cases ranking in top 10 in most diagnoses. The overuse of drugs in dyspepsia therapy causes economic burden for both health facilities and patients. There has not been much research on the analysis of prescribing patterns and therapy costs, especially in the Banyumas area. **Objectives:** This study aims to identify the prescribing pattern and compare the cost of therapy in dyspepsia patients issued by Klinik Pratama Soedirman. **Methods:** This study was an observational study with descriptive analytic approach on 117 dyspepsia patients at Klinik Pratama Soedirman by total sampling. Data were taken from the patients' medical records in the period March-August 2024. Data were analyzed univariately, then analyzed bivariately using the Chi-square or Fisher Exact test. Data on therapy costs were compared using the Mann-Whitney and Kruskal-Wallis tests. **Key findings:** 77.78% of patients were female, 85.47% were aged 18-25 years, and 90.59% of patients used BPJS financing. The most common number of main drugs used was >1 drug (65.82%), with the use of adjuvant drugs totaling 80 prescriptions (68.37%). The highest number of adjuvant drugs was 1 adjuvant drug (72.5%). There was a significant difference between the cost of therapy based on the main drug (p=0.008) and the use of adjuvant drugs (p=0.019). **Conclusions:** There was no significant association between gender, age, and type of patient financing with dyspepsia prescribing patterns whether based on number of main drugs or adjuvant drug uses. Further research is needed to assess the cost-effectiveness of therapy with patient outcomes.

Keywords: Anaerobic bacteria, chronic periodontitis, gingival crevicular fluid, *Lactobacillus reuteri* probiotic, scaling and root planning

Introduction

Dyspepsia is a chronic or recurrent discomfort or pain characterized by a burning sensation in the epigastric region. Dyspepsia is classified into organic and functional dyspepsia. Organic dyspepsia occurs due to structural abnormalities such as peptic ulcer, gastroesophageal reflux, and cancer [14]. Functional dyspepsia generally occurs without structural abnormalities and is often associated with psychological factors [18]. If not properly managed, dyspepsia may progress to serious complications such as gastric cancer, esophageal cancer, or pancreatic cancer [4]. A study in Iran by Moghimi-Dehkordi et al. (2011) found that dyspepsia imposes a financial burden on patients, especially in hospitalization and treatment costs. Another study stated that rational prescribing can reduce the economic burden on dyspepsia patients [2].

WHO data indicates that global dyspepsia cases reach 13–40% annually [5]. Meanwhile, a study by Lee et al. (2024) estimated the global prevalence of dyspepsia to be 8.4%, with higher prevalence in developing countries (9.1%) than in developed countries (8%). In Indonesia, dyspepsia ranks among the top ten most common diseases, with a prevalence of 40–50%. Indonesia ranks after the United States and the United Kingdom in dyspepsia prevalence [19]. Functional dyspepsia frequently affects young adults, with a prevalence of 9.9%, and is more common in females [11]. At Klinik Pratama Soedirman, dyspepsia is one of the most frequently encountered conditions, with most patients being university students.

Pharmacological therapy for dyspepsia aims to reduce symptoms. Treatment options include Proton Pump Inhibitors (PPIs), H2 receptor antagonists (H2RAs), antacids, or combinations of these [7]. A study conducted in Cijantung found that 14.06% of dyspepsia therapies were not aligned with the formulary [17]. However, large-scale research regarding treatment appropriateness in Banyumas has not been conducted.

Irrational drug use commonly occurs in developing countries. The most frequent issues include polypharmacy, inappropriate antibiotic use, excessive injection use, non-adherence to clinical guidelines, incorrect dosages, and non-generic prescribing [6]. Polypharmacy is commonly practiced by physicians in developing countries and may increase drug costs borne by patients [15].

The high dyspepsia prevalence in Indonesia, including Banyumas, is reflected by the large number of dyspepsia cases at Klinik Pratama Soedirman. However, research identifying prescribing patterns and therapy costs for dyspepsia patients at this clinic is lacking. Therefore, this study aims to analyze prescribing patterns and therapy costs among dyspepsia patients at Klinik Pratama Soedirman.

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Materials and Methods

This study used an observational method with a cross-sectional approach by collecting and observing secondary data consisting of dyspepsia patient records, prescribed medications, and therapy costs. The study population consisted of patients with ICD-10 code K30 or functional dyspepsia. The research sample included patients with ICD-10 code K30 at Klinik Pratama Soedirman during the period of March–August 2024 who met the inclusion and exclusion criteria. Variables in this study included sex, age group, type of patient financing, prescribing patterns, and therapy costs from the clinic's perspective. Sampling was conducted using the total sampling technique, with a total of 117 patients.

Tools and Materials

Data collection tools used in this study included a computer to access electronic medical records of dyspepsia patients and therapy cost data from the pharmacy department, writing instruments, and a calculator.

Research Procedure

The study was conducted from October to December 2024, beginning with the collection of demographic data and therapy costs for dyspepsia patients. Collected data were sorted based on inclusion and exclusion criteria. The next step involved analyzing and categorizing the prescribing patterns given to the patients. After categorization, therapy costs for each prescribing pattern group were compared. The comparison results were then interpreted based on statistical test outcomes.

Data Analysis

Collected data were analyzed using univariate and bivariate methods. Univariate analysis was used to describe the distribution of patient demographics and prescribing patterns presented in tables. Demographic data included sex, age group, and type of patient financing. Prescribing patterns were categorized based on the number of main drugs and adjuvant drugs. Bivariate analysis was performed to compare therapy costs among prescribing pattern groups using the Mann-Whitney and Kruskal-Wallis tests, and to assess associations between demographic factors and prescribing patterns using the Chi-square and Fisher-Exact tests.

Results and Discussion

The analysis of 117 samples that met the inclusion and exclusion criteria is as follows. The study results show that 26 patients (22.22%) were male, while 91 patients (77.78%) were female. The majority of patients were between 18–25 years old. A total of 100 patients (85.47%) were aged 18–25 years, and 17 patients (14.53%) were older than 25 years. The youngest patient was 18 years old, while the oldest was 67 years old. Most dyspepsia patients at Klinik Pratama Soedirman used BPJS as their type of healthcare financing. The study found that 11 patients (9.41%) used non-BPJS financing, while 106 patients (90.59%) used BPJS.

The highest number of main drugs used for dyspepsia patients at Klinik Pratama Soedirman was more than 1 main drug, amounting to 77 prescriptions (65.82%), whereas single main-drug usage amounted to 40 prescriptions (34.18%). The administration of main drugs was most often accompanied by adjuvant drug use, with 1 adjuvant drug used in 58 prescriptions (49.57%), while more than 1 adjuvant drug was used in 22 prescriptions (18.8%). The most common adjuvant prescribing pattern was the combination of more than 1 main drug with 1 adjuvant drug, totaling 41 prescriptions (35.04%).

The median therapy cost incurred by Klinik Pratama Soedirman to treat dyspepsia patients was IDR 2,946 for the use of 1 main drug, with a maximum cost of IDR 22,200, whereas the use of >1 main drug had a median cost of IDR 6,002 with a maximum cost of IDR 24,048. The highest total cost incurred by the clinic was IDR 237,662 for prescriptions involving >1 main drug. Comparative analysis using the Mann-Whitney test yielded a p-value of 0.008. This indicates that there is a significant difference in cost between the use of 1 main drug and >1 main drug.

The largest median expenditure was found in the combination of >1 main drug and >1 adjuvant drug, namely IDR 14,837 with a maximum of IDR 37,883. The highest total cost incurred by the clinic was IDR 501,411 for the combination of >1 main drug and 1 adjuvant drug, with a maximum cost of IDR 39,106. Comparative analysis using the Kruskal-Wallis test yielded a p-value of 0,019. This indicates that there is a significant difference in cost among the different groups based on the number of main drugs and adjuvant drugs used.

Patient characteristics related to prescribing patterns were analyzed using the Chi-square test for sex and age group, and the Fisher-Exact test for financing type. Bivariate analysis results showed p-values of 0.145 and 0.559 for sex, 0.511 and 0.139 for age group, and 0.327 and 1 for financing type. These results indicate that there is no significant relationship between the characteristics of sex, age group, and financing type with the prescribing patterns of dyspepsia patients at Klinik Pratama Soedirman.

The results of the study conducted on 117 patients showed that dyspepsia patients at Klinik Pratama Soedirman had various demographic characteristics. The study results stated that the proportion of female patients was greater than that of male patients, within the 18–25-year age group, and with BPJS as the type of healthcare financing. This is in line with the study by Kim & Kim (2020), which stated that the prevalence of dyspepsia among females is higher than among males. Although the mechanism of dyspepsia occurrence in men and women is very complex, several factors indicating these differences can serve as mechanistic explanations. These factors include sex hormones, psychological distress, central stimulation through the corticotropin-releasing factor (CRF) pathway, changes in amygdala function, ghrelin, genetic factors, gastrointestinal microbiota conditions, and dietary factors. These factors can influence the nervous system, changes in motility, and gastrointestinal sensitivity. This results in differences in dyspepsia incidence rates between men and women. The high prevalence of dyspepsia among women at Klinik Pratama Soedirman is due to the demographic characteristics of clinic visitors. Most visitors to Klinik Pratama Soedirman are students of Universitas Jenderal Soedirman. The

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proportion of female students at Universitas Jenderal Soedirman is higher than that of male students. This contributes to the high incidence of dyspepsia at Klinik Pratama Soedirman.

Table 1 Patient demographic characteristics

Characteristic	Frequency	Percentage
Sex		
Male	26	22,22%
Female	97	77,78%
Age		
18-25 years	100	85,47%
>25 years	117	14,53%
Type of Financing		
BPJS	106	90,59%
Non-BPJS	11	9,41%

Table 2 Dyspepsia medication prescribing patterns

Characteristic	Frequency	Percentage
1 Main Drug	**40**	**34,18%**
without adjuvant drug	6	5,12%
1 adjuvant drug	17	14,52%
>1 adjuvant drug	17	14,52%
>1 Main Drug	**77**	**65,82%**
without adjuvant drug	31	26,49%
1 adjuvant drug	41	35,04%
>1 adjuvant drug	5	4,27%

Table 3 Therapy cost

Drug Group	Total Cost (Thousand Rp)	Maximum Cost (Thousand Rp)	Median Cost (Thousand Rp)	*p-value*
Without adjuvant drug				
1 Main drug	35,84	22,20	2,94	0,008
>1 Main drug	237,66	24,04	6,00	
With adjuvant drug				
1 Main drug + 1 Adjuvant	150,04	17,5	7,25	
1 Main drug + >1 Adjuvant	193,18	19,29	9,14	0,019
>1 Main drug + 1 Adjuvant	501,41	39,10	10,29	
>1 Main drug + >1 Adjuvant	103,66	37,88	14,83	

Most patients were aged 18–25 years. This is consistent with the study by Seyedmirzaei et al. (2014), which stated that the prevalence of dyspepsia occurs mostly in young adults. Another study conducted at a hospital in Tangerang City stated that individuals aged 46–55 years are the group most affected by dyspepsia. Increasing age leads to a decline in physiological function of the digestive tract. This triggers changes in gastric motility and gastric acid secretion (Rangka et al., 2024). There is no significant relationship between age and the incidence of dyspepsia. Meanwhile, other studies show variable correlations between age and dyspepsia occurrence. Dyspepsia is influenced by several factors, mainly low meal frequency, irritative foods, and insufficient meal portions (Julaiha et al., 2022). The high incidence of dyspepsia among young adults is due to the fact that most visitors to the clinic are undergraduate students at Universitas Jenderal Soedirman, most of whom are aged 18–25 years.

Most patients used BPJS. This is consistent with the study by Saadah et al. (2022), which stated that BPJS patients constitute the largest proportion of healthcare facility users in Indonesia. The study, conducted at Klinik Insani, found that in 2018 dyspepsia was the most common condition experienced by BPJS patients. In that year, there were an average of 2,096 BPJS patients per month, whereas non-BPJS patients numbered fewer than 300 per month. This is supported by the study of Irawan and Ainy (2018), which stated that BPJS patients are the largest proportion of patients at primary healthcare facilities [8].

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Table 4 Relationship between patient demographics and prescribing patterns

Characteristics	1 Main Drug	>1 Main Drug	*p-value*	Without Adjuvant	With Adjuvant	*p-value*
Sex						
Male	12	14	0,145	7	19	0,559
Female	28	63		30	61	
Age						
18-25 years	33	64	0,511	29	68	0,139
>25 years	8	13		8	12	
Type of Financing						
BPJS	38	68	0,327	34	73	1
Non-BPJS	2	9		3	8	

This high proportion is due to several factors such as ease of access when using BPJS, the broad coverage of BPJS users, and mandatory BPJS membership for all Indonesian citizens. The high BPJS utilization benefits the public because the costs borne by BPJS patients are relatively lower compared to those without BPJS. BPJS usage can reduce the number of medications prescribed to patients. This allows both the patient and the clinic to reduce the economic burden of therapy costs. The high prevalence of BPJS users at Klinik Pratama Soedirman is due to the fact that most visitors are students at Universitas Jenderal Soedirman, who are required to be BPJS participants with Klinik Pratama Soedirman as their designated primary healthcare facility.

In this study, the most frequently used number of main drugs was >1 main drug. This is consistent with the recommendation by Sidik (2024), which states that dyspepsia only requires a combination of two drugs [24]. This combination consists of a PPI or H2 antagonist plus a prokinetic agent. This combination includes the main drug to reduce gastric acid levels and relieve symptoms. Prokinetic drugs may be used to relieve nausea. Antacids may be used to relieve gastric pain quickly. Sucralfate may also be used to protect the gastric mucosa from acid exposure.

The most common adjuvant prescribing pattern was the combination of more than 1 main drug with 1 adjuvant drug. This is inconsistent with the study by Lestari & Wahyuningsih (2021), which stated that adjuvant drug use increases the potential for drug interactions [13]. Concurrent use of H2 antagonists and paracetamol may result in H2 antagonists inhibiting the glucuronyltransferase enzyme. This can reduce paracetamol metabolism in the liver. The use of NSAIDs should be avoided in dyspepsia patients.

The most frequently used adjuvant drugs in dyspepsia prescriptions at Klinik Pratama Soedirman were analgesics. The use of analgesics in dyspepsia patients is inconsistent with Tai & McAlindon (2021), who stated that analgesics, especially nonselective NSAIDs, should be avoided because they can cause gastrointestinal side effects [26]. Nonselective NSAIDs reduce prostaglandin production, which helps form the protective layer of the gastric mucosa. This occurs due to NSAID inhibition of the COX-1 enzyme. This statement is supported by Pittayanon et al. (2019), who stated that NSAIDs decrease the cost-effectiveness of dyspepsia therapy.

Therapy costs without adjuvants were compared between groups receiving 1 main drug and those receiving >1 main drug. The median cost for 1 main drug was IDR 2,946 with a maximum of IDR 22,200, while >1 main drug had a median of IDR 6,002 with a maximum of IDR 24,048. The Mann-Whitney test produced a p-value of 0.008, indicating a significant difference between the two groups. This is consistent with Sirajuddin et al. (2013), which stated that combination antidispepsia therapy incurs higher costs compared to single-drug therapy [25]. This can occur because the greater the number of drugs prescribed, the greater the cost borne by the healthcare facility. Single-drug therapy using ranitidine has a higher cost-effectiveness than the combination of ranitidine and omeprazole. However, further research is needed to assess the cost-effectiveness of single versus combination therapy for dyspepsia.

Therapy costs with adjuvants were compared between groups based on the number of adjuvant drugs. Groups compared were: 1 main drug + 1 adjuvant drug (median IDR 7,250, maximum IDR 17,500); 1 main drug + >1 adjuvant drug (median IDR 9,140, maximum IDR 19,292); >1 main drug + 1 adjuvant drug (median IDR 10,292, maximum IDR 39,106); and >1 main drug + >1 adjuvant drug (median IDR 14,837, maximum IDR 37,883). The Kruskal-Wallis test produced a p-value of 0.019. This indicates a significant difference in therapy costs between the adjuvant groups. Significant cost differences may result from the number and type of adjuvant drugs used. The more adjuvant drugs used, the greater the cost borne by the healthcare facility.

This is consistent with Afrilia et al. (2022), who stated that the number of drugs significantly affects the costs borne by patients. The use of adjuvant drugs adds economic burden to healthcare facilities and patients. The use of adjuvant drugs should be carefully evaluated regarding indications and possible side effects. At Klinik Pratama Soedirman, the most commonly used adjuvant drugs were analgesics and antispasmodics. These drugs may cause gastrointestinal issues such as esophageal sphincter relaxation, gastric irritation, and abdominal pain [26].

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The relationship between sex and prescribing patterns among dyspepsia patients at Klinik Pratama Soedirman was assessed using hypothesis testing. Chi-square analysis produced p-values of 0.145 and 0.559. These results indicate that there is no significant relationship between sex and prescribing patterns, whether based on the number of main drugs or the use of adjuvant drugs. This is inconsistent with the study by Cebrino & de la Cruz (2023), conducted in Spain, which reported that 28.1% of women received polypharmacy prescriptions, compared to only 17.2% of men [1]. This difference is based on several factors, the most important being healthcare utilization patterns—women visit healthcare facilities more frequently than men.

Another study by Wang et al. (2023) reported similar findings, showing that polypharmacy is more common in women than in men [28]. Data from 55,081 samples in the United States showed polypharmacy occurring in 5,035 women and 4,113 men. Differences in study results may be due to age characteristics, as the majority of subjects in the present study were young adults with similar symptom patterns.

The relationship between age and prescribing patterns in dyspepsia patients at Klinik Pratama Soedirman was tested using Chi-square analysis. The p-values obtained were 0.511 and 0.139. These results indicate that there is no significant relationship between age and prescribing patterns, whether based on the number of main drugs or the use of adjuvant drugs. This is inconsistent with Wang et al. (2023), who stated that age is an epidemiological factor strongly associated with polypharmacy [28]. Their study found that elderly individuals (>65 years) had the highest rates of polypharmacy, far exceeding those aged 40–65 and 20–39. Among 55,081 samples, 5,217 elderly patients experienced polypharmacy, compared to 3,524 aged 40–65 and 407 aged 20–39. Polypharmacy in older adults may occur due to degenerative symptoms requiring additional treatments. This is supported by Delara et al. (2022), who stated that polypharmacy frequently occurs among older patients [3]. Differences in study results may be due to physiological characteristics being relatively similar among patients and the small number of older adults in the present study.

Fisher-Exact analysis regarding the relationship between financing type and prescribing patterns produced p-values of 0.327 and 1. These results indicate that there is no significant relationship between financing type and prescribing patterns, whether based on the number of main drugs or adjuvant drugs. This contrasts with the study by Rachmayanti et al. (2024), which found that health insurance factors are significantly associated with polypharmacy in tertiary healthcare facilities [20]. BPJS users were found to receive more medications compared to non-BPJS users. These differences may be due to differences in medication policies between primary and tertiary healthcare services. Polypharmacy may lead to drug interactions, altered therapy outcomes, and increased treatment costs. It is recommended to avoid polypharmacy in both primary and tertiary healthcare facilities [27]. Differences in study results may also be attributed to the disproportionate number of BPJS versus non-BPJS patients. These differences indicate that Klinik Pratama Soedirman does not differentiate prescriptions for dyspepsia patients based on sex, age, or financing type.

Conclusion

The majority of dyspepsia patients at Klinik Pratama Soedirman were female, within the 18–25-year age group, and using BPJS financing. The most frequently used main drug regimen for dyspepsia patients was a combination of >1 main drug. The most frequently used number of adjuvant drugs was 1 adjuvant drug. The most commonly used drug combination was >1 main drug and 1 adjuvant drug. Based on the number of main drugs, the use of >1 main drug had a higher median cost (IDR 6,002) compared to 1 main drug (IDR 2,948). There was a difference in therapy costs between these two groups. Based on the number of adjuvant drugs, the combination of >1 main drug and >1 adjuvant drug had the highest median cost (IDR 14,837), while 1 main drug and 1 adjuvant drug had the lowest (IDR 7,250). There was a difference in therapy costs among all four groups. There was no relationship between sex, age group, and patient financing type with the dyspepsia prescribing pattern at Klinik Pratama Soedirman, either based on the number of main drugs or the use of adjuvant drugs.

Supplementary Material

None

Author Contributions

RFA : Conceptualization, Methodology, Writing-Original Draft. **FWP** : Data Curation, Formal Analysis, Visualization. **JM** : Supervision, Funding Acquisition, Writing- Review & Editing. **MAW** : Supervision, Funding Acquisition, Writing- Review & Editing.

Conflict of Interest

The authors have no financial conflicts of interest to declare.

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