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INTRODUCTION **Dyspepsia is a common** complaint that someone experiences at a particular time. This condition is described as a complaint or a collection of symptoms (syndrome), which consists of pain or discomfort in the epigastrium, nausea, vomiting, bloating, early feeling of fullness, full stomach, belching, regurgitation, and a burning sensation in the chest^{1,2}. Dyspepsia is also a health problem that is often encountered in daily life. It is a health complaint related to eating or gastrointestinal disorders^{3,4}.

With a prevalence of 10–20%, **functional dyspepsia (FD) is one of the most** frequent functional diseases, hurting the gastrointestinal tract^{3,5}. **The prevalence of dyspepsia in** Asia based on research results in Asian countries (China, Hong Kong, Indonesia, Korea, Malaysia, Singapore, Taiwan, Thailand, and Vietnam) is 43-79.5% of dyspepsia patients. Most Asian patients have dyspepsia that has not been investigated and without any warning signs⁶. In Indonesia, a relatively high prevalence of dyspepsia was found in Makassar in 2011 (55%), Solo in 2008 (51.8%), Yogyakarta (30.6%) and Surabaya in 2013 (23.5%), and in Jakarta, which has the lowest prevalence (8%)⁷.

According to the Bandung Health Office⁸, dyspepsia is a non-communicable disease in the 10th position of the 20 most prominent diseases in a Public Health Center in Bandung, with 36,918 cases in 2016. The heterogeneous symptoms of dyspepsia and the absence of specific treatments for the causal cause of functional dyspepsia can lead to irrational treatment. The use of drugs can be rational if the patient gets treatment according to their needs adequately⁹. Irrational use of drugs can result in undesirable things such as a decrease in the quality of therapy that can increase morbidity and mortality, the risk of unwanted effects triggering unwanted reactions, and bacterial resistance^{10,11}.

From the results of Mulandani et al.¹², research on the Pattern of Drug Use in outpatient dyspepsia patients at H. Abdul Manap Hospital, Jambi, it was known that most of the 76 dyspepsia patients there used the proton-pump inhibitor (PPI) drug class (lansoprazole, omeprazole) **for the treatment of** dyspepsia, which was 50.66% in 2017 and 48.28% in 2018. The research by Musnelina and Agung¹³ found that omeprazole (17.19%) was found to be the most used kind of therapy, followed by an antagonist combination of H₂ + prokinetic + other drug groups (14%) and exact dosage and frequency (85.3%).

The most prolonged period of medication therapy was between 1 to 7 days (89.4%), and ranitidine (14.4%) was found to be the most suitable type of therapy according to the formulary, and the dyspeptic medication therapy was shown to be 85.9% compatible with the formulary. Bandung is one of the big cities in Indonesia with a large population. Batununggal is one of the districts with the largest population in Bandung. Based on the

statistics, the Public Health Center in Batununggal District Bandung is a primary level health facility with the second largest number of outpatients in Bandung¹⁴. Research on the pattern of dyspepsia drug use in Bandung has not been found.

Therefore, the research objectives were to determine the pattern of drug use in patients with dyspepsia, including the proper indication, the right drug selection, the correct dose, and the right time interval of administration in a Public Health Center in Batununggal Bandung. MATERIALS AND METHODS Materials This research was conducted in a Public Health Center in Batununggal District Bandung from January to March 2020. The tools used were stationery, data collection sheets, and laptops, and materials used were patients' prescriptions, references such as research journals, books, and guidelines therapy.

The guidelines therapy used was National Consensus for **the Management of Dyspepsia** and Helicobacter pylori Infection⁷. Methods Research type and design This research was observational research using a descriptive cross-sectional research design¹⁵. The sampling technique employed the purposive sampling method retrospectively¹⁶. Ethical approval This study has been approved by the Health Research Ethics Committee of the Faculty of Medicine of Universitas Padjadjaran (Reference number: 71/UN6.KEP/EC/2020). Population and sample The populations in this research were all prescriptions of patients diagnosed with dyspepsia with comorbidities by the physician in charge of the patients and treated in a Public Health Center in Batununggal District Bandung from January to March 2020. The samples obtained were 341 patient prescriptions. The samples had to meet the inclusion and exclusion criteria.

Inclusion criteria were the prescription in Public Health Center in Batununggal District Bandung included patients aged 17-65 years old with the complete data, including: The patient's name, gender, age, and prescribed drug data, including the name of the drug, strength, dosage form, dosage, amount of drug, and frequency of drug administration; The prescription was given in January-March 2020; Patients diagnosed with dyspepsia and received medication by the physician in charge; Patients with comorbidities. Exclusion criteria were the prescriptions in a Public Health Center in Batununggal District Bandung with incomplete data, patients aged less than 17 years and more than 65 years; prescriptions were given before or after January-March 2020; and patients who were not diagnosed with dyspepsia and did not receive dyspepsia drugs by the physician in charge of the patients. The sample was reduced from 341 to 104 patient prescriptions based on the inclusion and exclusion criteria.

Data analysis Data analysis was carried out quantitatively to determine **the prevalence of dyspepsia** patients and qualitatively to obtain an overview of drug use patterns in

patients. The results were then presented in the form of tables and figures. RESULTS AND DISCUSSION Patient demographics Demographic data collected from prescriptions was age and gender. Other demographic data, such as occupation and education, cannot be included because the data source only uses patient prescriptions. Demographic data of patients in a Public Health Center in Batununggal District Bandung are shown in Figures 1 and 2. Based on Figure 1, it could be inferred that women experienced dyspepsia more often, totaling 66 patients (63.462%) compared to 38 male patients (36.538%). This result was similar with the dyspepsia patients in 2019 in the Wanasari Public Health Center, Brebes Regency that also stated the incidence in women is more than men, around 74,8%¹⁷.

This was because women were more easily stressed, had irregular eating patterns and unhealthy diets, used painkillers, and had hormonal conditions that were often unstable¹⁸. When a person is stressed, stimulation will be carried to the hypothalamus in the brain to release corticotrophin-releasing factor (CRF). The CRF will stimulate the release of adrenocorticotrophic hormone (ACTH) to stimulate the adrenal glands to produce several hormones, one of which is the cortisol hormone¹⁹.

This increase in the cortisol hormone will stimulate the production of stomach acid and can inhibit prostaglandin E, an inhibitor of the adenyl cyclase enzyme in parietal cells that is protective of the gastric mucosa. Thus, it will cause complaints of dyspepsia²⁰. Figure 2 shows that most dyspepsia patients occur in elderly patients aged 56-65 years (28.846%). This result was different from dyspepsia patients in 2019 in the Wanasari Public Health Center, Brebes Regency that also showed the highest percentage of people with dyspepsia age was 41-50 years (23.1%)¹⁷.

This can be due to differences in the population of each district and because the late elderly was included in the age range. In this age group, the body has experienced a decrease in body physiological function. With age, the risk of developing dyspepsia is higher due to habits related to lifestyle, diet, and stress²¹. / Figure 1. Percentage of patients by gender / Figure 2. Percentage of patients by age Characteristics of dyspepsia drug use In Figure 3, dyspepsia patients in Public Health Center in Batununggal District Bandung were given either monotherapy or a combination of two or three drugs.

Antacids were the most widely used drugs for monotherapy, which amounted to 51.923%. This result was similar with the dyspepsia patients in 2019 in the Wanasari Public Health Center, Brebes Regency that also stated the percentage of antacids was the most prominent (36.5%) among other drug classes¹⁷. Antacids were compounds that worked to neutralize stomach acid and to help reduce pain²². Meanwhile, antacids were most often used in combination with omeprazole for combination therapy, which

amounted to 23.077%—the **use of these two drugs** in combination aimed at increasing the effectiveness of the treatment. Omeprazole bound K⁺/H⁺ ATPase irreversibly and further inhibited the secretion of hydrochloric acid, while antacids neutralized stomach acid²³.

Patients were given two or three drug combinations based on the patient's specific condition, and the treatment was aimed to be more effective. This result is different from the dyspepsia patients in 2019 in the Wanasari Public Health Center, Brebes Regency, which also stated that among the combination therapy, antacids were most often used with domperidone which amounted to 30.5%¹⁷. / Figure 3. Dyspepsia treatment categories Use of dyspepsia drugs based on drug class Figure 4 shows that antacids were **the most widely used** class of drugs.

This result was similar with dyspepsia patients in 2019 in the Wanasari Public Health Center, Brebes Regency, that antacids are also **the most widely used drug** class in treating dyspepsia compared to other classes of dyspepsia drugs¹⁷. Antacids have been used for centuries in the treatment of patients with dyspepsia. This drug continued to be used in general by patients to treat ulcers and intermittent dyspepsia^{24,25}. / Figure 4. Percentage of dyspepsia drug usage based on drug class Use of dyspepsia drugs based on dosage form One common way of giving drugs was through the oral route. The oral route was possible because it was generally safer, cheaper, and more accessible²⁶.

This result is similar to the dyspepsia patient in Anutapura General Hospital Palu that also showed **the most widely used** route of administration was oral, which was 98.14%²⁷. In Figure 5, most dosage forms used were tablet dosage forms (40.299%) because this dosage form had the advantage of having an accurate dosage in each unit and being practical. Similar research results were not found in another Public health center, so the study results were compared with hospitals. This result is similar to the dyspepsia in outpatients in 2017-2018 in the H.

Abdul Manap Regional General Hospital of Jambi city that stated the tablet dosage form is the most frequently used because this dosage form is 50% more widely circulated in the market¹⁷. Patients who sought treatment were mainly in the productive age range who did not have difficulty swallowing, such as children and the elderly. Thus, the drug was given in the form of a tablet. In addition, tablet dosage forms were also more economical for patients²⁸. / Figure 5. Percentage of dyspepsia drug usage based on dosage form Drug use patterns Figure 6 shows the research results regarding the accuracy of drug selection.

The research data showed that the drugs used in all dyspepsia patients were 100%

correct in drug selection, meaning that the drugs selected for dyspepsia patients were by the therapy guidelines in the literature. The drugs used could be antacids, PPIs, histamine 2 receptor antagonists (H2RAs), prokinetic agents, and cytoprotection⁷. Omeprazole was the first PPI used in therapy to reduce stomach acid production strongly. This drug inhibited acid secretion by selectively inhibiting the H⁺/K⁺ ATPase enzyme in parietal cells²⁹. The PPIs were ideal drugs because they had a short serum half-life, were activated near the site of action and had a long duration of action³⁰.

The use of prokinetics such as domperidone could also provide symptom improvement in some patients because domperidone acted as an inhibitor of peripheral dopamine receptors. This means that domperidone could increase esophageal peristalsis, reduce esophageal sphincter pressure, gastric motility, and peristalsis, and improve gastroduodenal coordination. This drug was also used to prevent acid reflux from the stomach to the throat, thus preventing vomiting. Domperidone caused symptom improvement in a small number of patients with chronic dyspepsia^{31,32}.

Antacids worked to neutralize stomach acid, reduce pain, and prevent inflammation³³. Two compounds: Al(OH)₃ and Mg(OH)₂, were absorbed in small amounts so that they worked longer in the stomach, and the purpose of administration was achieved. In addition, the combination of Al(OH)₃ and Mg(OH)₂ in antacid preparations affected gastric emptying or relatively small intestinal function³⁴. / Figure 6. Accuracy of drug selection Each drug had a specific therapeutic spectrum. Thus, administering a drug was only recommended for patients who had symptoms that were by the properties of the drug administered³⁵. Figure 7 shows the results of the research that the drugs administered to all dyspepsia patients were 100% accurate.

This means that these drugs were appropriate for use in cases of dyspepsia. Some literatures^{24,36} stated that antacids, omeprazole, and domperidone were indicated for patients with dyspepsia. Drug dosage significantly affects the effect of drug therapy. The range of daily doses for the treatment of dyspepsia, according to some literature, was 600 mg up to 1600 mg for antacids, a maximum daily dose of 20 mg for omeprazole, and a daily dose of 10-30 mg for domperidone^{24,36-39}. In Figure 8, 59.62% of the doses were given precisely so that the goal of drug therapy could be achieved. A total of 12.5% of the drug dose was prescribed less than it should be, and 27.88% of patients received an overdose.

Similar research results were not found in another Public health center, so the study results were compared with hospitals. This result is similar to the dyspepsia outpatients in Tk. IV Cijantung Hospital East Jakarta, which also reported that the percentage of the correct dose is greater than the percentage of incorrect dose¹³. Too small a dose will

not guarantee that the desired therapeutic levels are achieved. In contrast, giving an excessive dose will have a high risk of causing side effects and the occurrence of unwanted drug reactions.

This could be influenced by the combination of drugs given simultaneously, so it was necessary to increase or decrease the dose^{35,40}. Figure 9 shows the research results regarding the accuracy of the drug administration time interval. The time interval for administration was the time interval in giving the first drug to the second, third, and so on. The frequency of drug administration should be kept as practical and straightforward as possible to make it easy for patients to adhere. The more frequent the drug administration per day was, the lower the compliance level of taking medication was^{41,42}.

According to several literature, antacids were taken regularly three to four times a day (every six-eight hours), omeprazole was taken once a day (every 24 hours), and domperidone was taken three times a day (every eight hours)^{36,39,43}. Medicines are taken three times a day had their effects worn off in eight hours, so it was better if they were administered three times a day⁴¹. As many as 71% of patients had the correct interval of drug administration. This result was similar to the dyspepsia patients in 2019 in the Wanasari Public Health Center, Brebes Regency that also stated that the accuracy of the time interval for drug administration was in a large percentage, which was around 92.6%¹⁷.

The administration interval had to be right so that drug levels were maintained within the therapeutic range to achieve the therapeutic goals⁴⁴. On the other hand, 29% of patients had incorrect time intervals of drug administration. These results indicated that the use of dyspepsia drugs was still not appropriate. A total of 30 patients received a drug administration whose interval was less or more than it should be in a day. If the time interval for administration was less than it should be, the drug level in the body was also less than it should be and would not have a therapeutic effect, so that healing could not be achieved.

On the other hand, if the time interval was more than it should be, the higher dose of the drugs could accumulate in the body, which would cause several side effects or unwanted drug reactions^{45,46}. The duration of drug administration had to be by the patient's illness. Empiric therapy for dyspepsia patients had to be given for 1-4 weeks (7-30 days)⁷. Figure 10 shows the research results regarding the accuracy of the duration of drug administration. Duration of drug administration that was shorter or longer than it should affect the treatment results⁴⁷. The analysis results showed that 9.62% of the patients had the correct time of administration of the drug, while 90.38%

of the patients had an incorrect time of administration of the drug. Patients who seek treatment at the First Outpatient Ward of a Public Health Center in Bandung were given medicines for 1-6 days.

This might have happened because pain, nausea, and discomfort in the stomach recovered quickly without lengthy therapy¹³. Similar research results were not found in another Public health center, so the study results were compared with hospitals. This result is similar to the dyspepsia outpatients in Tk. IV Cijantung Hospital East Jakarta stated that the duration of drug therapy for dyspeptic patients most often used by physicians was around 1-7 days¹³. / Figure 7. Accuracy of drug indication / Figure 8. Accuracy of drug dose / Figure 9. Accuracy of drug administration time intervals / Figure 10.

Accuracy of duration of drug administration CONCLUSION It can be concluded that most single therapy in dyspepsia was antacids, and most combination drugs were antacids and omeprazole. The accuracy of drug selection and the indication was utterly appropriate. In contrast, the accuracy of dosage, time interval for drug administration, and duration of drug administration were not wholly appropriate, so that collaboration between health professionals is needed to achieve rationality of drug use.

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