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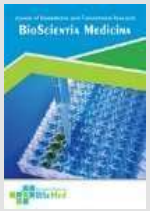

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Analysis of Risk Factors and Predictors of Endoscopic Findings in Patients with Gastrointestinal Disorders: A Single Center Observational Study at Sanjiwani General Hospital, Gianyar, Bali, Indonesia

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A B S T R A C T

Background: Gastrointestinal disorders are a common health problem in Indonesia. Endoscopy is an important procedure in diagnosing and managing this disorder. This study aims to analyze risk factors and predictors of endoscopic findings in patients with gastrointestinal disorders at regional hospitals in Bali. **Methods:** This research is an analytical observational study with a cross-sectional design. The research subjects were patients with gastrointestinal disorders who underwent endoscopy at regional hospitals in Bali during the period January 2022 to December 2023. Data was collected through medical records and interviews. Data analysis was carried out using the Chi-square test and logistic regression. **Results:** A total of 1074 patients were included in this study. The mean age of patients was 45.3 years (SD 15.2). The most common endoscopic finding was gastritis (35.2%), followed by gastric ulcer (15.8%) and esophagitis (12.4%). Risk factors that were significantly associated with endoscopic findings were age > 45 years (OR 1.78; 95% CI 1.23-2.57), male gender (OR 1.54; 95% CI 1.11-2.14), history of smoking (OR 2.31; 95% CI 1.65-3.24), and history of use of non-steroidal anti-inflammatory drugs (NSAIDs) (OR 1.98; 95% CI 1.39-2.82). **Conclusion:** Age > 45 years, male gender, smoking history, and history of NSAID use are risk factors that are significantly associated with endoscopic findings in patients with gastrointestinal disorders at regional hospitals in Bali.

1. Introduction

Gastrointestinal disorders are a diverse group of diseases that affect the organs in the digestive system, from the esophagus to the anus. These conditions cover a wide range of health problems, ranging from mild and temporary to chronic and life-threatening. Gastrointestinal disorders are common throughout the world, including in Indonesia, and pose a significant health burden on individuals and society. In Indonesia, gastrointestinal disorders are one of the main causes of morbidity and mortality. 2018 Basic Health Research (Riskesdas) data shows that the prevalence of gastrointestinal disorders in Indonesia reached 13.7%. This figure includes various types of disorders, such as gastritis, gastroesophageal reflux disease (GERD), peptic ulcers, inflammatory bowel disease (IBD), irritable bowel syndrome (IBS), and gastrointestinal cancer. Several factors contribute to the high prevalence of gastrointestinal disorders in Indonesia. These factors include unhealthy eating patterns, such as consuming foods high in fat, sugar, and low in fiber, smoking habits, alcohol consumption, *Helicobacter pylori* infection, stress, and use of certain drugs, such as non-steroidal anti-inflammatory drugs (NSAIDs).[1,2]

Endoscopy is a medical procedure that allows doctors to look directly inside the digestive tract using an instrument called an endoscope. An endoscope is a

thin, flexible tube equipped with a camera and light source. This procedure is carried out by inserting an endoscope through the mouth or anus, depending on the part of the digestive tract to be examined. Endoscopy plays an important role in the diagnosis and management of gastrointestinal disorders. This procedure allows doctors to identify various abnormalities in the gastrointestinal tract, such as inflammation, ulcers, polyps, tumors, and bleeding. Apart from that, an endoscope can also be used to take tissue samples (biopsy) for further examination in the laboratory. With accurate and timely information from endoscopy, doctors can make the right diagnosis and plan appropriate treatment strategies for patients with gastrointestinal disorders. This can improve treatment outcomes and patient quality of life.[3,4]

Various risk factors are thought to influence endoscopic findings in patients with gastrointestinal disorders. These factors can be demographic, such as age and gender, or lifestyle-related, such as smoking and alcohol consumption. In addition, the patient's medical history, such as NSAID use and *H. pylori* infection, may also influence endoscopic findings. Previous studies have shown that several risk factors are associated with an increased risk of certain endoscopic findings. For example, older age is associated with an increased risk of atrophic gastritis, intestinal metaplasia, and gastric cancer. Male gender is also associated with an increased risk of gastroesophageal reflux disease (GERD) and esophageal cancer. Smoking is a significant risk factor for various gastrointestinal disorders, including gastritis, peptic ulcers, Crohn's disease, and gastrointestinal cancer. Smoking can damage the protective lining of the digestive tract, increase stomach acid production, and disrupt the normal function of the digestive system. Alcohol consumption can also increase the risk of gastrointestinal disorders, especially gastritis, stomach ulcers, and gastrointestinal cancer. Alcohol can irritate the lining of the digestive tract, increase stomach acid production, and interfere with nutrient absorption. NSAID use is a common risk factor for gastritis, gastric ulcers, and gastrointestinal bleeding. NSAIDs can inhibit the production of prostaglandins, which are natural substances that protect the lining of the digestive tract. This can cause inflammation, ulcers, and bleeding. *H. pylori* infection is a major risk factor for gastritis, peptic ulcers, and gastric cancer. These bacteria can cause chronic inflammation of the stomach lining, which can develop into ulcers and cancer.[5,6]

Research on risk factors and predictors of endoscopic findings in patients with gastrointestinal disorders in Indonesia is still limited. Most of the research was carried out in large hospitals in big cities, such as Jakarta and Surabaya. Research in regional hospitals, especially in areas with unique geographical and cultural characteristics such as Bali, is still rarely conducted. Bali is one of the provinces in Indonesia that has a high prevalence of gastrointestinal disorders. This is thought to be related to the Balinese diet which tends to be high in fat and low in fiber, as well as smoking habits and high alcohol consumption.[7,8] This study aims to fill this knowledge gap by analyzing risk factors and predictors of endoscopic findings in patients with gastrointestinal disorders at regional hospitals in Bali.

2. Methods

This research is an analytical observational study with a cross-sectional design. This design was chosen because it is suitable for identifying risk factors and predictors of endoscopic findings in patients with gastrointestinal disorders. Cross-sectional studies allow collecting data on exposure (risk factors) and outcomes (endoscopic findings) at the same time, thereby providing an overview of the relationship between the two. The study population was all patients with gastrointestinal disorders who underwent endoscopy at regional hospitals in Bali during the period January 2022 to December 2023. The study sample was taken randomly from the study population using a simple random sampling technique. The sample size was calculated using the Lemeshow formula with a confidence level of 95%, test power of

80%, and prevalence of endoscopic findings of 50%. Based on these calculations, a minimum of 385 samples are needed. However, to increase the power of the test and take into account the possibility of dropping out, the number of samples taken was 1074 patients. The inclusion criteria are patients aged ≥18 years; Patients diagnosed with gastrointestinal disorders based on clinical symptoms and supporting examinations; Patients undergoing endoscopy at regional hospitals in Bali during the period January 2022 to December 2023; Patients who are willing to participate in the research and sign informed consent. Meanwhile, the exclusion criteria are patients with a history of previous gastrointestinal surgery; Patients with serious comorbidities, such as advanced heart, lung, liver, or kidney disease; Patients who cannot be interviewed or do not have complete medical record data.

Research variables include independent variables: Age, gender, smoking history, history of NSAID use, history of alcohol consumption, history of infection of *H. pylori*, and family history of disease; Dependent variable: Endoscopic findings. The operational definition includes age: The patient's age at the time of endoscopy is categorized as ≤45 years and >45 years; Gender: Patient gender, categorized into male and female; Smoking history: Patient smoking history, categorized into yes (smoking ≥10 cigarettes/day for ≥1 year) and no; History of NSAID use: The patient's history of NSAID use in the last 1 month before undergoing endoscopy, categorized into yes and no; History of alcohol consumption: History of patient alcohol consumption, categorized into yes (alcohol consumption ≥2 glasses/day for ≥1 year) and no; Infection history of *H. pylori*: History of infection *H. pylori* Based on the results of histopathological examination or rapid urea breath test, patients are categorized into yes and no; Family history of disease: The patient's family history of disease suffering from gastrointestinal disorders, such as gastritis, stomach ulcers, or gastrointestinal cancer, was categorized into yes and no; Endoscopic findings: Endoscopic findings found in patients are categorized into gastritis, gastric ulcer, esophagitis, and others.

Research data was collected using two instruments, namely: 1. Data collection form: This form is used to record patient demographic data (age, gender), medical history (smoking history, history of NSAID use, history of alcohol consumption, history of infections of *H. pylori*, family history of the disease), and endoscopic findings. This form was developed based on a literature review and adapted to conditions in regional hospitals in Bali. 2. Interview guide: Interview guides are used to elicit further information about the patient's medical history and other risk factors that may not be recorded in the medical record. This interview guide was also developed based on a literature review and adapted to conditions in regional hospitals in Bali. Sampling: The research sample was taken randomly from the research population using simple random sampling technique. Medical Record Data Collection: Data on patient demographics, medical history, and endoscopic findings were extracted from patient medical records. Interview: Patients who met inclusion criteria were interviewed using an interview guide to obtain additional information about medical history and other risk factors. Interviews were conducted by researchers who had been trained to conduct research interviews. Endoscopic Examination: The results of the patient's endoscopic examination are recorded in the data collection form. Endoscopic findings were classified according to predetermined criteria.

The data that has been collected is checked again to ensure completeness and consistency. Incomplete or inconsistent data will be corrected or excluded from analysis. The edited data is then coded according to the operational definition of research variables. The coded data is entered into a computer using statistical software. The data that has been entered into the computer is checked again to ensure there are no data input errors. Data analysis was performed using SPSS version 25 statistical software. Univariate analysis was used to describe patient demographic and clinical characteristics, as well as endoscopic findings. Bivariate analysis is used to test the relationship

between the independent variable and the dependent variable using the Chi-square test. Multivariate analysis using logistic regression was used to identify independent risk factors associated with endoscopic findings.

3. Results

Table 1, it can be seen that the majority of patients were over 45 years old (54.2%). The proportion of male patients (54.7%) was slightly greater than female patients (45.3%). In addition, there were more patients who did not have a history of smoking (64.0%) compared to those who had a history of smoking (36.0%). The majority of patients also had no history of NSAID use (75.5%) compared to those who had a history of NSAID use (24.5%).

Table 1. Patient demographic and clinical characteristics.

Characteristics	Number (n)	Percentage (%)
Age (years)		
≤ 45	492	45,8
> 45	582	54,2
Gender		
Male	588	54,7
Female	486	45,3
Smoking history		
Yes	387	36
No	687	64
History of NSAID use		
Yes	263	24,5
No	811	75,5

Table 2 shows the distribution of endoscopic findings in patients participating in the study. The most common finding was gastritis (35.2%), followed by gastric ulcer (15.8%), esophagitis (12.4%), and other findings (36.7%). These proportions of endoscopic findings provide valuable information about the types of gastrointestinal disorders most frequently encountered in the study population. Gastritis, as the most common finding, indicates inflammation of the stomach lining, which can be caused by various factors such as infection of *H. pylori*, use of certain medications, or excessive alcohol consumption. Gastric ulcers, which rank second, indicate an open wound in the stomach lining which can cause symptoms such as heartburn, nausea, vomiting, and bleeding. Esophagitis, which comes in third, indicates inflammation of the esophageal lining, which can be caused by stomach acid reflux or infection. Other categories include various other endoscopic findings that a patient may encounter, such as polyps, tumors, esophageal varices, or other anatomical abnormalities. A fairly large proportion of other findings (36.7%) indicated that there were various gastrointestinal disorders found in the study population.

Table 2. Endoscopic findings.

Endoscopic findings	Number (n)	Percentage (%)
Gastritis	378	35,2
Gastric ulcer	169	15,8
Esophagitis	133	12,4
Other	394	36,7

Table 3 presents an analysis of risk factors associated with endoscopic findings in patients with gastrointestinal disorders. Patients over 45 years of age had a 1.78 times higher risk of experiencing endoscopic findings compared with patients 45 years of age or younger. This result was statistically significant (p = 0.002), indicating that age over 45 years was an independent risk factor for endoscopic findings. Male patients had a 1.54 times higher risk of experiencing endoscopic findings compared with female patients. This result was also statistically significant (p = 0.009), indicating that the male gender is an independent risk factor for endoscopic findings. Patients with a history of smoking had a 2.31 times higher risk of experiencing endoscopic findings compared with patients who did not smoke. These results were highly statistically significant (p < 0.001), indicating that smoking history is a very strong risk factor for endoscopic findings. Patients with a history of NSAID use had a 1.98 times higher risk of experiencing endoscopic findings compared with patients who did not use NSAIDs. These results were also highly statistically significant (p < 0.001), indicating that a history of NSAID use is a very strong risk factor for endoscopic findings. Table 3 shows that age over 45 years, male gender, smoking history, and history of NSAID use are independent risk factors that are significantly associated with an increased risk of endoscopic findings in patients with gastrointestinal disorders. These results provide strong evidence that these risk factors need to be considered in the diagnosis and management of patients with gastrointestinal disorders.

Table 3. Risk factor analysis of endoscopic findings.

Risk factors	OR	95% CI	p-value
Age > 45 years	1,78	1,23-2,57	0,002
Gender (male)	1,54	1,11-2,14	0,009
Smoking history	2,31	1,65-3,24	<0,001
History of NSAID use	1,98	1,39-2,82	<0,001

4. Discussion

As we age, the human body experiences various physiological changes that affect the function of vital organs, including the digestive tract. These changes can affect various aspects of digestion, from the production of enzymes and gastric acid to intestinal motility and the composition of the gut microbiota. As a result, older individuals become more susceptible to various gastrointestinal disorders. Gastric acid plays an important role in the digestive process. This acid helps break down food, activates digestive enzymes, and kills harmful bacteria that enter the body through food. However, stomach acid production tends to decrease with age. Gastric mucosal atrophy is a condition in which the gastric mucosal layer, namely the layer that produces stomach acid, becomes thin and damaged. This condition can be caused by chronic inflammation, infection of *H. pylori*, or autoimmune factors. Parietal cells are cells in the stomach that are responsible for producing stomach acid. As we age, the number of parietal cells tends to decrease, so stomach acid production also decreases. Several hormones, such as gastrin and somatostatin, play a role in regulating stomach acid production. Levels of these hormones can change with age, affecting stomach acid production. Although reducing stomach acid production can reduce the risk of stomach ulcers caused by excess acid, it can also increase the risk of other gastrointestinal disorders. Low stomach acid can reduce the body's ability to kill harmful bacteria that enter through food, thereby increasing the risk of bacterial infections, such as *H. pylori*. Infection *H. pylori* is a major risk factor for gastritis, peptic ulcers, and gastric cancer. Apart from that, low stomach acid can also interfere with the absorption of certain nutrients, such as vitamin B12 and iron. This can cause vitamin B12 deficiency anemia and iron deficiency anemia, which can cause symptoms such

as fatigue, shortness of breath, and dizziness.[9,10]

Intestinal motility is the ability of the intestines to contract and push food through the digestive tract. Normal intestinal motility is important for efficient digestive processes and optimal nutrient absorption. However, intestinal motility tends to decrease with age. Nerve cells in the intestine are responsible for controlling intestinal muscle contractions. As we age, the number of these nerve cells tends to decrease, so intestinal motility also decreases. Several hormones, such as motilin and serotonin, play a role in regulating intestinal motility. Levels of these hormones can change with age, affecting intestinal motility. Physical activity can stimulate intestinal motility. As we age, physical activity tends to decrease, so intestinal motility also decreases. Constipation is a condition where a person experiences difficulty defecating or defecating less than three times a week. Constipation can be caused by various factors, including decreased intestinal motility. Intestinal transit time is the time it takes for food to pass through the entire digestive tract. Decreased intestinal motility can prolong intestinal transit time, thereby increasing the contact time between harmful substances in food and the intestinal lining. This can increase the risk of colon cancer. Diverticulosis is a condition in which small pouches (diverticula) form in the wall of the large intestine. Diverticulosis can be caused by increased pressure within the colon due to decreased intestinal motility. These diverticula can become inflamed and cause diverticulitis, a condition that can cause symptoms such as abdominal pain, fever, and changes in bowel habits.[11,12]

Gut microbiota is a collection of bacteria that live in the intestines. These bacteria play important roles in a variety of body functions, including digestion, nutrient absorption, and immune system regulation. The composition of the gut microbiota may change with age. As we age, the number of good bacteria in the gut, such as *Bifidobacteria* and *Lactobacilli*, tends to decrease. These bacteria play an important role in maintaining a healthy digestive tract by inhibiting the growth of bad bacteria, producing vitamins, and stimulating the immune system. As we age, the number of bad bacteria in the intestines, such as *Clostridium difficile* and *Enterobacteriaceae*, tends to increase. These bacteria can cause infection and inflammation of the digestive tract. Gut microbiota diversity is a measure of the number and types of different bacteria in the gut. As we age, the diversity of gut microbiota tends to decrease. This can affect immune function and increase the risk of inflammation in the gastrointestinal tract. Changes in gut microbiota can increase the risk of various gastrointestinal disorders. A decrease in the number of good bacteria and an increase in the number of bad bacteria in the intestines can increase the risk of bacterial infections, such as infections *Clostridium difficile*. This infection can cause diarrhea, fever, and abdominal pain. Inflammatory bowel disease (IBD) is a group of diseases characterized by chronic inflammation of the gastrointestinal tract. Changes in the gut microbiota are thought to play a role in the development of IBD. Some studies suggest that changes in gut microbiota may increase the risk of colon cancer. Physiological changes that occur in the gastrointestinal tract with increasing age can increase susceptibility to various disorders. Decreased gastric acid production, decreased intestinal motility, and changes in gut microbiota are some of the most significant changes.[13,15]

This study shows that the male gender is an independent risk factor for endoscopic findings in patients with gastrointestinal disorders. These findings are in line with various epidemiological studies that report the prevalence of certain gastrointestinal disorders, such as gastroesophageal reflux disease (GERD) and esophageal cancer, to be higher in men than in women. However, the exact mechanisms underlying these risk differences remain the subject of interesting and complex research. One of the factors thought to play a role in the difference in the risk of gastrointestinal disorders between men and women is the hormone testosterone. Testosterone is the main sex hormone in men, produced mainly by the testicles. This hormone plays an important role in the

development and maintenance of male sexual characteristics, as well as various other physiological functions. Testosterone can stimulate parietal cells in the stomach to produce more stomach acid. Increased stomach acid production can cause irritation and damage to the stomach lining, increasing the risk of gastritis and stomach ulcers. Testosterone can affect intestinal motility, namely the ability of the intestines to contract and push out food. Some studies suggest that testosterone may decrease intestinal motility, which can cause constipation and increase the risk of colon cancer. The function of the lower esophageal sphincter (LES) is a ring-shaped muscle located at the border between the esophagus and the stomach. The LES functions to prevent reflux of stomach acid into the esophagus. Some studies suggest that testosterone may decrease LES pressure, which may increase the risk of GERD. Behavioral differences between men and women may also contribute to differences in the risk of gastrointestinal disorders. Men tend to have higher smoking habits and alcohol consumption than women. Both of these habits are significant risk factors for various gastrointestinal disorders. Cigarette smoke contains thousands of dangerous chemicals that can damage the protective lining of the digestive tract, increase stomach acid production, and disrupt the normal function of the digestive system. This can increase the risk of gastritis, stomach ulcers, Crohn's disease, esophageal cancer, stomach cancer, and colon cancer. Alcohol can irritate the lining of the digestive tract, increase stomach acid production, and interfere with nutrient absorption. Excessive alcohol consumption can increase the risk of gastritis, stomach ulcers, fatty liver disease, pancreatitis, and gastrointestinal cancer.[15,16]

Genetic factors are also thought to play a role in the difference in risk of gastrointestinal disorders between men and women. Several studies have identified certain genetic variations associated with an increased risk of certain gastrointestinal disorders in men. For example, genetic variations in the gene coding for the androgen hormone receptor (AR) have been associated with an increased risk of GERD in men. In addition, genetic factors can also influence an individual's response to environmental factors, such as smoking and alcohol consumption. Some people may be more susceptible to the harmful effects of these environmental factors because of their genetic makeup. It is important to note that the difference in risk of gastrointestinal disorders between men and women is not caused by a single factor, but rather by a complex interaction between various factors, including hormones, behavior, and genetics. These factors can influence each other and contribute synergistically to the increased risk of gastrointestinal disorders in men. For example, testosterone may increase the risk of GERD by lowering LES pressure. However, these effects can be exacerbated by smoking, which can also lower LES pressure and damage the lining of the esophagus. Additionally, genetic factors may make some people more susceptible to the harmful effects of testosterone and smoking.[16,17]

Smoking is a very strong risk factor for various gastrointestinal disorders. Cigarette smoke contains thousands of dangerous chemicals that can damage the protective lining of the digestive tract, increase stomach acid production, and disrupt the normal function of the digestive system. Cigarette smoke can damage the mucous layer, which is the protective layer that lines the inside of the digestive tract. This mucosal damage can cause inflammation, ulcers, and increase the risk of bacterial infection. Smoking can stimulate the parietal cells in the stomach to produce more stomach acid. Excess stomach acid can cause irritation and damage to the stomach lining, increasing the risk of gastritis and stomach ulcers. Smoking can reduce the production of bicarbonate, a natural substance that neutralizes stomach acid. Decreased bicarbonate production can increase the risk of damage to the lining of the stomach and intestines. Smoking can interfere with the normal function of the muscles in the digestive tract, thereby reducing intestinal motility. This can cause constipation and increase the risk of colon cancer.[17,18]

Nonsteroidal anti-inflammatory drugs (NSAIDs) are a group of drugs commonly used to treat pain,

inflammation, and fever. NSAIDs work by inhibiting the enzyme cyclooxygenase (COX), which plays a role in the production of prostaglandins, natural substances that trigger inflammatory and pain responses. Although effective in relieving symptoms, the use of NSAIDs, especially long-term or in high doses, can increase the risk of gastrointestinal disorders. Gastrointestinal disorders associated with NSAIDs can range from mild symptoms such as dyspepsia (indigestion) to serious complications such as peptic ulcers (stomach or duodenal ulcers) and gastrointestinal bleeding. Side effects of NSAIDs on the gastrointestinal tract occur through several interrelated pathophysiological mechanisms, including inhibition of prostaglandin production, direct damage to the mucosa, and disruption of microcirculation. Prostaglandins are a group of lipids that play an important role in various physiological functions, including the protection of the gastrointestinal mucosa. Prostaglandins are produced by the enzyme cyclooxygenase (COX) from arachidonic acid, which is an essential fatty acid. There are two main isoforms of the COX enzyme, namely COX-1 and COX-2. COX-1 plays a role in the production of prostaglandins involved in normal physiological functions, such as protection of the gastric mucosa, regulation of renal blood flow, and platelet aggregation. COX-2, on the other hand, is mainly induced during inflammation and is responsible for the production of prostaglandins that trigger pain, fever, and inflammation. NSAIDs work by inhibiting the COX enzyme, both COX-1 and COX-2. Inhibition of COX-1 can reduce the production of prostaglandins that protect the gastric mucosa, thereby increasing the risk of mucosal damage by gastric acid and pepsin. The mucus forms a protective layer that lines the surface of the stomach and prevents direct contact between stomach acid and the mucosa. Prostaglandins stimulate mucus production by gastric mucosal cells. Bicarbonate is a natural substance that neutralizes stomach acid. Prostaglandins stimulate bicarbonate production by gastric epithelial cells. Adequate blood flow to the gastric mucosa is important to maintain mucosal integrity and speed up the healing process if damage occurs. Prostaglandins dilate blood vessels in the gastric mucosa, thereby increasing blood flow. Inhibition of prostaglandin production by NSAIDs may disrupt these mucosal protective mechanisms, thereby increasing the risk of mucosal damage by gastric acid and pepsin. This mucosal damage can cause gastritis (inflammation of the stomach), which can develop into peptic ulcers (stomach or duodenal ulcers) if left untreated.[18,19]

Apart from inhibiting prostaglandin production, some NSAIDs can also cause direct damage to the mucosal lining of the gastrointestinal tract. Some NSAIDs can interact with epithelial cell membrane phospholipids, which can cause disruption of membrane function and cell death. Some NSAIDs can increase the production of free radicals, which are unstable molecules that can damage cells. Free radicals can damage DNA, proteins, and lipids in cells, causing cell death. Some NSAIDs can inhibit protein synthesis, which is important for cell maintenance and repair. Inhibition of protein synthesis can cause disruption of cell function and cell death. Direct damage to this mucosa can cause inflammation and ulceration, especially in the stomach and small intestine. This ulceration can cause gastrointestinal bleeding, which can manifest as hematemesis (vomiting of blood), melena (black stools), or anemia. NSAIDs can also interfere with microcirculation in the digestive tract, namely the flow of blood to the small blood vessels in the walls of the digestive tract. Some NSAIDs can cause vasoconstriction (narrowing of the blood vessels), which can reduce blood flow to the gastrointestinal mucosa. Some NSAIDs can increase vascular permeability (leakage of blood vessels), which can cause edema (swelling) and bleeding in the gastrointestinal mucosa. Some NSAIDs can inhibit platelet aggregation (blood clotting), which can increase the risk of bleeding in the gastrointestinal mucosa. Microcirculation disorders can cause ischemia (lack of oxygen supply) and damage to the mucosal lining of the gastrointestinal tract. Ischemia can exacerbate mucosal damage caused by

prostaglandin inhibition and direct damage by NSAIDs.[19,20]

5. Conclusion

This study shows that age over 45 years, male gender, smoking history, and history of NSAID use are independent risk factors that are significantly associated with an increased risk of endoscopic findings in patients with gastrointestinal disorders. These results provide strong evidence that these risk factors need to be considered in the diagnosis and management of patients with gastrointestinal disorders.

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