

# Incidence and Characteristic of Gastroesophageal Reflux Disease (GERD): Before and During Covid-19 Pandemic

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## ABSTRACT

**Background:** The incident numbers of gastroesophageal reflux disease (GERD) in Asia is increasing gradually from year to year. Activity restriction (lockdown) that happened during COVID-19 pandemic affects society's eating habit and life style which are risk factors of GERD and the incidence of gastroesophageal reflux. This study was conducted to find the incidence and characteristics of GERD during COVID-19 pandemic and compared with the previous situation in patients who met the diagnostic criteria at H. Adam Malik General Hospital.

**Method:** This research is a descriptive research study with a cross sectional design study where data were taken based on data from medical records at H. Adam Malik General Hospital in 2017–2022 with the sampling technique used is total sampling, where the research subjects were all patients diagnosed GERD that met the inclusion criteria.

**Results:** The incidence of GERD before (2017–2019) and during the COVID-19 pandemic (2020–2022) were 21 and 37 patients respectively (there was a 76% escalation in the incidence of GERD during the COVID-19 pandemic compared to before the COVID-19 pandemic). The similar characteristics of GERD patients before and during the COVID-19 pandemic are age > 40 years, work as an employee, high school graduate, and overweight body mass index (BMI).

**Conclusion:** The incidence of GERD has increased during the COVID-19 pandemic compared to before the pandemic.

**Keywords:** COVID-19, gastroesophageal reflux disease, incidence, pandemic

## ABSTRAK

**Latar belakang:** Angka kejadian gastroesophageal reflux disease (GERD) di Asia perlahan meningkat dari tahun ke tahun. Pembatasan aktivitas (lockdown) selama pandemi COVID-19 memengaruhi kebiasaan makan dan gaya hidup masyarakat yang merupakan faktor risiko dari GERD dan memengaruhi tingkat kejadian dari refluks gastroesophageal. Penelitian ini dilakukan untuk melihat besarnya kejadian dan karakteristik GERD saat pandemi COVID-19 dan dibandingkan dengan keadaan sebelumnya pada pasien yang memenuhi kriteria diagnosis di RSUP H. Adam Malik.

**Metode:** Penelitian ini merupakan studi penelitian deskriptif dengan desain studi cross sectional. Data yang diambil berasal dari data rekam medis di RSUP H. Adam Malik pada tahun 2017–2022 dengan teknik pengambilan sampel yang digunakan adalah teknik total sampling, yaitu subjek penelitian merupakan seluruh pasien yang didiagnosis GERD yang memenuhi kriteria inklusi.

**Hasil:** Insiden kasus GERD pada saat sebelum (2017–2019) dan selama pandemi COVID-19 (2020–2022) masing-masing sebesar 21 dan 37 orang pasien (terdapat peningkatan 76% kejadian GERD selama pandemi COVID-19 dibandingkan saat sebelum pandemi COVID-19). Persamaan karakteristik pasien GERD sebelum dan saat pandemi COVID-19 adalah usia > 40 tahun, pekerjaan sebagai pegawai, tamatan sekolah menengah atas, dan indeks massa tubuh (IMT) berlebih.

**Simpulan:** Angka kejadian GERD mengalami peningkatan selama masa pandemi COVID-19 dibandingkan saat sebelum pandemi.

**Kata kunci:** COVID-19, gastroesophageal reflux disease, insiden, pandemi

## INTRODUCTION

Gastroesophageal reflux disease (GERD) is a common disease worldwide and caused by retrograde flow of gastric content to esophagus. The diagnosis of GERD is usually based on classic symptoms and response to acid suppression drugs. Typical symptoms of GERD include heartburn and regurgitation.<sup>1</sup> The global incidence of GERD in adults is 11–38.8% and varies between countries. Epidemiological data in America shows that 1 in 5 adults had symptoms of esophageal reflux in the form of heartburn and/or regurgitation of stomach acid once a week. The incidence of GERD in Asia itself is slowly increasing from year to year. In Southeast Asia and West Asia, prevalence of GERD after 2005 is 6.3–18.3%.<sup>2</sup> According to research conducted in Jakarta, the prevalence of GERD was 13.3%.<sup>3</sup> Several risk factors for gastroesophageal reflux include older age, excessive body mass index (BMI), smoking, anxiety or depression, insufficient physical activity at work, food, and drugs.<sup>4,5</sup>

Due to high contagiousness of SARS-CoV-2 and its rapid spread, since March 2020, several restrictions have been applied to human activities and physical interactions around the world to prevent the spread of the virus, which forced people to stay at home and affected their lifestyle which could be potentially negative on health.<sup>6</sup> As it is known that lifestyle and food are risk factors for GERD, so changes that occur during this pandemic can potentially affect the incidence rate of GERD and the authors are interested in seeing the number of GERD events during the COVID-19 pandemic and compared to previous situation.

## METHOD

This is a retrospective descriptive study with a cross-sectional design study. This research was conducted in the medical records section of the H. Adam Malik General Hospital in Medan from August to October 2021 and started after obtaining ethical clearance (No.629/KEPK/USU/2022) from Ethics Committee Faculty of Medicine, Universitas Sumatera Utara. The population in this study was all medical records data of GERD patients (inpatient and outpatient) at H. Adam Malik General Hospital Medan in May 2017–May 2019 and May 2020–May 2022. The inclusion criteria used were patients who met the diagnostic criteria for GERD i.e. typical symptoms of GERD (heartburn and regurgitation), GERD-Q score  $\geq 8$ , and/or endoscopy results. Meanwhile, the exclusion criteria were patient with incomplete medical record.

In this study, the samples (the number of reachable population was 71 people with 13 people as a sample being excluded and 58 people being studied) were obtained using the total sampling technique, where the research subjects were all patients who met the inclusion and exclusion criteria. Analysis data was done by using an analysis program statistics, statistical package for the social sciences (SPSS) version 22.0 for windows. Variables that will be seen in the medical record include the number of patients diagnosed with GERD, age, gender, education, occupation, weight, and height. Furthermore, the data will be analyzed to see a descriptive description of the incidence and characteristics of GERD patients at H. Adam Malik General Hospital Medan using bivariate analysis with the aim of obtaining a significant difference in the mean between the groups in the number of GERD patients before and during the COVID-19 pandemic and description of each research variable which is presented in the form of tables and frequency distribution diagrams. The significance value used in the study is 5%.

## RESULTS

**Table 1. GERD patient frequency distribution**

Time of incidence	GERD patients (n)	Mean	Total	p value
Before pandemic			21	0.2
2017	6	7		
2018	7			
2019	8			
During pandemic		12.3	37	
2020	6			
2021	16			
2022	15			

The incidence of GERD before the COVID-19 pandemic was 21 people and during the pandemic there were 37 people. Table 1 also illustrates the mean difference between the number of GERD patients before and during the COVID-19 pandemic with *p* value 0.2.

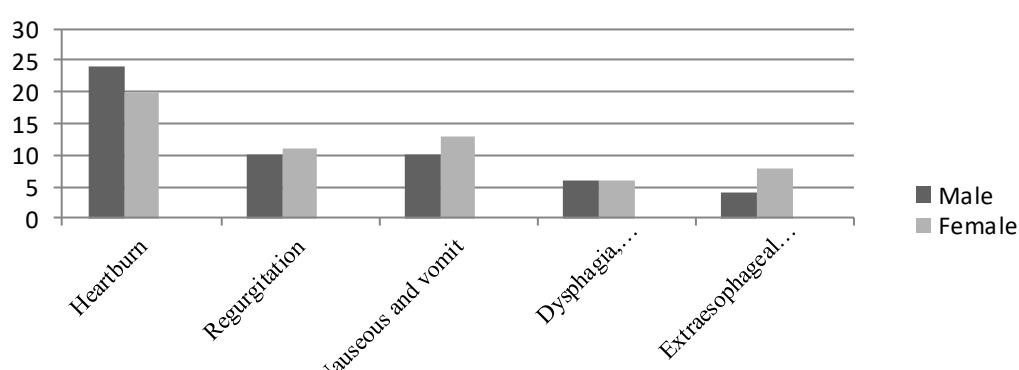
Based on table 2, 66.7% were outpatient GERD patients before the pandemic and 89.2% during the pandemic. Meanwhile, GERD patients who were hospitalized before the pandemic were 33.3% and during the pandemic 10.8%. Before COVID-19 pandemic, out of the 21 patients, male were 42.9% and female were 57.1%. Whereas, during pandemic, male patients were 54.1% and female were 45.9%. With regards to the age group, the majority of patients were between 46–55 years (28.6%) before pandemic and 56–65 years (21.8%) during pandemic. Based on the level of education, majority of patients before (57.1%) and during pandemic (67.6%) had a high school diploma. Before pandemic, majority of patients were employee and entrepreneur (28.6% each), while during the pandemic the majority were employee (27.0%). In regards to body mass index, majority of patients before (47.6%) and during pandemic (45.9%) were overweight.

**Table 2. Characteristics of GERD patients**

Variables	Before pandemic	During pandemic
Medical service		
Outpatient	14 (66.7%)	33 (89.2%)
Inpatient	7 (33.3%)	4 (10.8%)
Sex		
Male	9 (42.9%)	20 (54.1%)
Female	12 (57.1%)	17 (45.9%)
Age		
17–25	5 (23.8%)	3 (8.1%)
26–35	5 (23.8%)	7 (18.9%)
36–45	2 (9.5%)	7 (18.9%)
46–55	6 (28.6%)	7 (18.9%)
56–65	2 (9.5%)	8 (21.8%)
> 65	1 (4.8%)	5 (13.5%)
Education		
Elementary school	1 (4.8%)	0 (0%)
Junior high school	1 (4.8%)	5 (13.5%)
Senior high school	12 (57.1%)	25 (67.6%)
Bachelor	7 (33.3%)	7 (18.9%)
Occupation		
Not working	1 (4.8%)	4 (10.8%)
Employee	6 (28.6%)	10 (27.0%)
Entrepreneur	6 (28.6%)	7 (18.9%)
Farmer	1 (4.8%)	4 (10.8%)
Student	4 (19.0%)	2 (5.4%)
Housewife	3 (14.3%)	9 (24.3%)
Soldier	0 (0%)	1 (2.7%)
Body mass index (BMI)		
Underweight	3 (14.3%)	1 (2.7%)
Normal	8 (38.1%)	16 (43.2%)
Overweight	10 (47.6%)	17 (45.9%)
Obesity	0 (0%)	3 (8.1%)
Total	21 (100.0%)	37 (100.0%)

**Table 3. Clinical symptoms of GERD patients**

Clinical symptoms	Before pandemic (%)	During pandemic (%)
Heartburn	61.9	83.8
Nauseous and vomit	42.9	37.8
Regurgitation	38.1	35.1
Dysphagia, odynophagia	23.8	27.0
Extraesophageal symptoms	9.5	18.9



**Figure 1. Distribution of clinical symptoms by gender**

Based on table 3, the most common symptoms felt by patients is heartburn. In Figure 1, there is no statistically significant difference between men or women regarding the symptoms experienced.

Out of the 58 patients, 19 of them underwent endoscopy and the results can be seen in the table below.

**Table 4. Endoscopic view of GERD patients**

Results	Before pandemic (%)	After pandemic (%)
Mucosal break	2 (10.5%)	7 (37%)
Erosion and ulceration	1 (5.0%)	3 (16.0%)
Malignancy	1 (5%)	3 (16.0%)
Stricture	0 (0%)	2 (10.5%)
Total	4 (21.0%)	15 (79.0%)

## DISCUSSION

Out of the 58 medical records data obtained in this study, 21 patients suffered from GERD before the COVID-19 pandemic and 37 patients during the COVID-19 pandemic. The lack of samples is because some samples were excluded due to incomplete medical record data, did not meet the diagnostic criteria of GERD, and it is suspected that there were still many people who self-medicate or go to private practice. This shows that there was 76% escalation in GERD patients during the pandemic compared to the pre-pandemic period and this is in accordance with research in Saudi Arabia that found the prevalence of GERD during the pandemic to be more compared to before the pandemic.<sup>7</sup> The relationship between COVID-19 and gastrointestinal complaints is that SARS-CoV-2 binds to angiotensin converting enzyme-2 (ACE2) receptors in the digestive tract which can cause symptoms, such as nausea, vomiting, abdominal pain, diarrhea, etc. The incidence of nausea and vomiting symptoms that were also complained by GERD patients was found to vary from 1% to 29.4% in COVID-19 patients.<sup>8,9</sup> However, based on other research, there was no relationship between patients who confirmed positive for COVID-19 and the incidence rate of GERD.<sup>7</sup>

The frequency of GERD patients from year to year before pandemic was also found to be increased. However, at the start of the pandemic (in 2020), there was a decrease in the frequency of GERD patients compared to the pre-pandemic period. This is because during the COVID-19 pandemic, people were afraid of being infected by the SARS-CoV-2 virus and felt that the illness they were experiencing was not too urgent, thus reducing patient visits to hospitals.<sup>10</sup> Based on the results of the independent T-test which was conducted to find out whether there was a significant difference in

the mean between the groups in the number of GERD patients before and during the COVID-19 pandemic, *p* value = 0.2 was obtained. This value is greater than 0.05 and could be interpreted that there is no significant difference between the number of GERD patients before and during the COVID-19 pandemic. This is because the number of samples is still relatively small so further research is needed. In addition, it was also found that outpatient GERD patients both before and during the COVID-19 pandemic were more than GERD patients who were hospitalized. GERD patients are rarely hospitalized because their symptoms can be treated with drugs and GERD patients who were hospitalized based on this study are because these patients have a history of other diseases that require further treatment.<sup>11</sup>

At the time before pandemic, the number of female patients was found to be higher than males. Meanwhile, in the data during the pandemic, it was found that the predominant gender was male. These findings are in agreement with the other studies which found more male groups than female groups.<sup>5,12</sup> However, even though the predominant group is men, so far gender has not been found to be a statistically significant risk factor for GERD.<sup>12-14</sup> Several studies also showed that the clinical manifestations of GERD were almost same between men and women.<sup>5,15</sup>

This study also shows that before pandemic, the majority of patients were from the age group of 46–55 years, which is the middle age group according to WHO classification. During the pandemic, it was found that the age group 56–65 years was the age group that suffered most from GERD. These findings are in agreement with the other research which found that the age group > 40 years experienced GERD more than the younger groups.<sup>3,5,16</sup> GERD is more common in older patients. This is associated with the large number of drugs consumed by older patients which can also cause clinical GERD, like heartburn. In terms of activity as well, the older a person is, the activities undertaken tend to be less or less frequent exercise. This can cause a decrease in burning calories in the body. If this decrease in activity is followed by increased food intake, it will be easier to gain weight and excess BMI, which is a risk factor for GERD.<sup>17-19</sup>

For the level of education, both before and during the pandemic, the group with high school graduates was the most numerous and was followed by bachelor graduates, which is in accordance with other studies.<sup>3,20</sup> Several studies had reported that education level was not related nor had a significant effect on the incidence of GERD.<sup>3,12,21,22</sup>

During the pandemic, there was an increase in GERD patients who were not working compared to before. This is because during the COVID-19 pandemic many sectors in the economics experienced losses and were forced to close their business fields. Many companies had also termination of employment relationship, causing more people to be unemployed during the COVID-19 pandemic.<sup>23</sup> Meanwhile, both before and during the pandemic, the majority of GERD patients work as employees. This is in accordance with other studies which showed that GERD was more common in workers, especially those with a heavy workload. This workload can cause stress related to GERD pathogenesis, specifically increasing gastric acid secretion, reducing gastric emptying time, and increasing mucosal sensitivity to gastric acid in the esophagus.<sup>12,24</sup>

During the pandemic, there was also an increase in the number of GERD patients who were housewives, which is in line with the other study which showed that 19 out of 84 people were housewives who experienced GERD. The lockdown regulations (activity restrictions) during the COVID-19 pandemic also had an impact on the psychological factors of housewives. The role of housewives has increased during the pandemic, starting from being a teacher for their children and overcoming economic problems. This can lead to increased incidence of depression and stress among housewives, which are triggers for GERD itself.<sup>25,26</sup>

The group of GERD patients who were overweight was the predominant group either before or during the pandemic and increased during the pandemic. This increase in BMI is likely related to changes in physical activity which are decreasing due to restrictions on activities during the COVID-19 pandemic and changes in peoples' diets.<sup>27,28</sup> Individuals with excess BMI and obesity are also found to consume more foods that can induce GERD, such as fatty, spicy foods, and carbonated drinks.<sup>29</sup>

Most cases of GERD occur in overweight or obesity populations, this is due to anatomical and physiological changes in the gastroesophageal cavity, such as excess accumulation of visceral and subcutaneous fat in the abdomen, thereby increasing intra-abdominal pressure.<sup>7,13</sup>

The majority of clinical symptoms felt by patients both before and during the COVID-19 pandemic were heartburn, followed by nausea, vomiting, regurgitation (mouth feels sour/bitter or feels like acid is rising). Extraesophageal symptoms such as shortness of breath and cough were only slightly felt, but these symptoms

have increased during the pandemic. Nausea and vomiting were among the many complaints in GERD patients because reflux of stomach contents often causes a sour taste in the mouth, where this unpleasant taste causes complaints of nausea and vomiting. These complaints that were often complained of are in line with other studies which showed that the majority of complaints that were felt so that patients came for a check-up were heartburn which is a typical symptom of GERD.<sup>5,7,15</sup>

The general distribution of clinical symptoms based on gender presented in Figure 1 showed that there were no significant differences in statistic between male and female. This is in accordance with other researches which found that the clinical symptoms experienced by GERD patients were almost the same between men and women.<sup>5,15</sup>

Based on Table 4, it was found that 32.8% (19 patients) underwent endoscopy. The remaining 67.2% (39 patients) categorized as non-erosive reflux disease (NERD) group which is a subcategory of GERD where patients complaint presence of symptoms without erosions on endoscopic examination.<sup>30</sup> From the results of endoscopy, it could be seen that there have been several complications that have occurred in GERD patients, such as ulceration of the esophageal mucosa, strictures or narrowing of the lumen due to exposure to chronic acid reflux and disturbances in the healing process which can cause complaints of dysphagia in patients.<sup>31</sup> In addition, the most severe complication was found in GERD, which is malignancy, where the esophageal area that looks to have irregularities in the mucosa must be carefully examined and biopsied.<sup>32</sup>

The limitation of this study is that the data obtained were still in the form of secondary data which were medical records, so there were still some incomplete data, such as a history of smoking, alcohol, and drugs and it is hoped that further research can use the primary data in order to produce a better data.

## CONCLUSION

The incidence of GERD has increased during the COVID-19 pandemic compared to before the pandemic.

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