

The impact of COVID-19 on resident doctors as the frontline in health services

Desi Maghfirah¹, Muhammad Yusuf², Subhan Rio Pamungkas³, Sarah Firdausa¹,
Muhammad Ridho Akbar Eljatin¹, Sherina Arfi Febriyanti¹

¹Internal Medicine Department, Faculty of Medicine, Universitas Syiah Kuala, Banda Aceh, Indonesia

²Department of Surgery, Faculty of Medicine, Universitas Syiah Kuala, Banda Aceh, Indonesia

³Department of Psychiatry, Faculty of Medicine, Universitas Syiah Kuala, Banda Aceh, Indonesia

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ABSTRACT

As the number of confirmed cases of COVID-19 increases, the workload due to the pandemic can affect health workers and increase the risk of psychological stress. Psychological factors such as anxiety can cause various physiological responses, including gastroesophageal reflux disease (GERD) symptoms. The persistent symptoms of GERD can reduce the patient's quality of life. A cross-sectional survey was conducted in October 2021 at the Dr. Zainoel Abidin Regional General Hospital, Banda Aceh. A total of 91 Specialist Medical Education Program responded to the study. Data from respondents were collected through the generalized anxiety disorder-7 (GAD-7), GERD-Q, and WHOQOL-BREF questionnaires. The statistical analysis used was the contingency coefficient test. The results showed that 9.9% of respondents experienced suggestive GERD, minimal anxiety (92%), and good quality of life (51.6%). There was a significant relationship between anxiety levels and quality of life and the GERD prevalence of Specialist Doctor Education Program Participants during the COVID-19 pandemic ($p < 0.05$). Most Specialist Medical Education Program participants did not suffer from GERD with minimal anxiety, followed by mild and moderate anxiety. The majority had a good and moderate quality of life during the COVID-19 pandemic.

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Corresponding Author:

Desi Maghfirah

Internal Medicine Department, Faculty of Medicine, Universitas Syiah Kuala

Teuku Nyak Arief Street No.441, Kopelma Darussalam, Syiah Kuala, Banda Aceh, Aceh 23111, Indonesia

Email: desimaghfirah@usk.ac.id

1. INTRODUCTION

The initial documented case of coronavirus disease-2019 (COVID-19) was officially confirmed in Wuhan, China, in December 2019 [1]. The COVID-19 pandemic spread so rapidly that in March 2020, the world health organization (WHO) declared it a global pandemic [2]. Along with the increase in confirmed cases of COVID-19, the enormous workload due to the pandemic can affect health workers on the front line and can be at risk of experiencing psychological stress and other mental health symptoms [3].

Based on research in Japan with a large-scale survey on mental health, it was found that 85 out of 848 health workers in hospitals during the COVID-19 pandemic experienced moderate to severe anxiety disorders. Another study on health workers in China found that the rate of anxiety experienced by health workers was 44.6% [4]. Participants in the Specialist Medical Education Program have a high risk of experiencing psychological problems because doctors are expected to be able to meet the academic, clinical, and social demands that come from their profession [5]. Based on the research results on the Surgical

Specialist Education Program Participants at RSUD, dr. Zainoel Abidin Banda Aceh there was 98.1% of participants experienced mild anxiety during the COVID-19 pandemic. Several previous studies have reported an association between gastroesophageal reflux disease (GERD) and psychological factors such as anxiety [6]. Increasing evidence indicates that psychological factors are causative in the symptoms experienced by a subgroup of patients with gastrointestinal disorders and cannot be solely attributed to seeking healthcare (brain-gut disorder). Anxiety reported in GERD patients with chest pain was 24.7%, and in patients without chest pain was 35.17%. The severity of gastrointestinal disorders can be influenced by psychological factors and changes in pain perception through activity on the brain-gut axis, which also applies to GERD [7]. A study conducted during the COVID-19 pandemic found that anxiety was associated with significantly worsening symptoms from functional gastrointestinal disorders such as chest pain and burning in the epigastric region [8].

GERD is a chronic condition that arises when the contents of the stomach flow back into the esophagus, leading to bothersome symptoms and/or complications. Typical signs of GERD include heartburn and regurgitation, while atypical symptoms encompass throat discomfort, laryngitis, hoarseness, persistent cough, asthma, and disturbances in sleep patterns [9]. The worldwide prevalence of GERD in adults ranges from 11% to 38.8%, varying from one country to another [10]. In certain Asian studies, a higher occurrence of GERD has been observed, but most research has reported prevalence rates between 2.5% and 7.1% for weekly reflux, 3.8% to 4.6% for reflux occurring twice a week, and 2.1% for daily reflux [11]. A study conducted in 2020 on students enrolled in the Medical Education Study Program at the Faculty of Medicine, Syiah Kuala University, found that 17.6% of the students experienced GERD [12].

Symptoms of GERD can be persistent, around 80%, and can indicate an increased risk of several complications. Persistent symptoms can reduce work productivity and the patient's quality of life. The prevalence of GERD in doctors assessed using the gastroesophageal reflux disease-questionnaire (GERD-Q) was 27.4%. From the study, 21% experienced a low impact on their daily life, and 6.4% had a high impact on their daily life. Research conducted in China shows that GERD patients experienced decreased quality of life associated with psychological problems like anxiety [10].

According to the author's initial survey, which utilized data from the Education Coordinating Committee of Dr. Zainoel Abidin Public Hospital in Banda Aceh, it was found that participants in the Specialist Doctor Education Program had a significant level of work intensity. The COVID-19 pandemic directly impacted them, resulting in many participants being diagnosed with COVID-19. Specifically, participants in the Internal Medicine Specialist Medical Education Program accounted for 38.3% of the cases, the Ear Nose Throat-Head and Neck Health Sciences Specialist Medical Education Program accounted for 63.1%, and the Pulmonology Specialist Medical Education Program accounted for 41.8%. These departments have a higher risk of exposure to COVID-19 as their participants treat patients with uncertain diagnoses, leading to heightened anxiety about potential exposure to the virus. The high level of work intensity and high-risk infection of COVID-19 during work hours as the participants in the Specialist Doctor Education Program can be stressors for anxiety which will have a significant correlation with Gastroesophageal Reflux Disease.

This study aims to collect data relevant institutions can use to evaluate and develop strategies. This research seeks to examine how COVID-19 has affected resident doctors, who serve as frontline healthcare providers, by investigating its influence on anxiety, depression, and symptoms of gastroesophageal reflux disease (GERD) in relation to their quality of life. The ultimate goal is to find the best possible solutions to address healthcare professionals' physical and mental well-being at the forefront of providing healthcare services.

2. METHOD

This research is an observational analysis study that utilized a cross-sectional design. The study was carried out at the Regional Public Hospital of Dr. Zainoel Abidin in Banda Aceh and was conducted online in October 2021. The target populations of this study were Internal Medicine, ENT-Head and Neck Health Sciences, and Pulmonology Specialist Education Program at the Dr. Zainoel Abidin Public Hospital. The sample in this study was the above study population, who were selected based on inclusion and exclusion criteria. The sample must meet the criteria for active and registered participants of the Internal Medicine, Ear Nose Throat-Head and Neck Health Sciences, and Pulmonology Specialist Education Program at the Dr. Zainoel Abidin Public Hospital approved the research approval sheet. A total sampling technique was used, resulting in 91 respondents. As described in the current study, total sampling is a sampling technique where the sample size is equal to the population size. The more samples used, the lower the level of error. This technique is considered the most accurate and free from sample errors, making it suitable for this research.

The study using WHOQOL-BREF as an instrument, developed by the WHOQOL Group as a shorter version of the WHOQOL-100 instrument, is available in Indonesian and has demonstrated validity (0.614) and reliability (0.529). Therefore, it can be used in Indonesia to measure the quality of life [13], [14]. The diagnosis of GERD is based on the results of anamnesis, the completion of a questionnaire consisting of 6 questions assessing classic GERD symptoms, the impact of GERD on the patient's quality of life, the effects of medication use on symptoms in the last seven days, and monitoring therapy response using the GERD-Q. Based on the assessment from GERD-Q, if a score of >8 is obtained, there is a high likelihood that the patient is suffering from GERD, indicating the need for further evaluation. According to diagnostic studies, the GERD-Q questionnaire with a cut-off score of 8 has a specificity of 71.4% and a sensitivity of 64.6% [15]. The assessment of anxiety using the GAD-7. The initial validation study of the GAD-7 determined that at a cutoff score of 9, the estimated sensitivity was 89%, and the estimated specificity was 82% [16].

This study was conducted with a univariate analysis to show the distribution description of the independent variables, which are the level of anxiety and quality of life, as well as the dependent variable, which is GERD in the participants of the Specialist Medical Education Program during the COVID-19 pandemic. Bivariate analysis was conducted to determine how much anxiety level is with the prevalence of GERD and the relationship between GERD prevalence and quality of life. This research was proven by using the contingency coefficient test.

3. RESULTS AND DISCUSSION

A total of 91 participants from the Specialist Medical Education Program from the Department of internal medicine, ENT-Head and neck health sciences, pulmonology and respiratory medicine were selected based on inclusion criteria. The data was collected from October 1-31, 2021, using primary data through an online google forms questionnaire with the following characteristics.

The description of the characteristics of the research respondents can be seen in Table 1. The majority of respondents in this study were aged between 31-35 years and were predominantly male. Most respondents came from the Department of Internal Medicine, with the junior stage dominating the total sample.

Table 1. General characteristics of the respondents

Variable	n (%)
Age	
26-30 years	19 (21.0)
31-35 years	53 (59.0)
36-40 years	18 (20.0)
41-45 years	1 (1.0)
Gender	
Male	57 (63.0)
Female	34 (37.0)
Department	
Internal medicine	44 (48.0)
ENT-Head and Neck health sciences	21 (23.0)
Pulmonology and Respiratory medicine	26 (29.0)
Study stage	
Junior	41 (45.0)
Mid-level	29 (32.0)
Senior	21 (23.0)

Table 2 shows that the majority of respondents in this study amounted to 84 respondents (92%) who experienced minimal anxiety as measured by the generalized anxiety disorder-7 (GAD-7) questionnaire. The majority of respondents felt unknown reasons made them anxious. The data in Table 2 indicates that these study results are in line with the research on all health workers at the Japanese Red Cross Medical Center during the COVID-19 pandemic using the GAD-7 questionnaire. These findings showed 90.0% of respondents did not experience anxiety or had mild anxiety [4]. A study conducted on 7949 medical students from 49 medical faculties in Indonesia revealed that 43.7% of the respondents, or 3471 individuals, experienced symptoms of anxiety categorized as mild, moderate, or severe based on the GAD-7 questionnaire. Most medical students experienced mild anxiety, accounting for 29.8% of the respondents [17].

Meanwhile, another research regarding anxiety in the Surgical Specialist Medical Education Program at RSUDZA during the COVID-19 pandemic found that 98.1% of respondents experienced mild

anxiety, 1.9% of respondents experienced moderate anxiety, and no students experienced severe anxiety. Similarly, a previous study found that more than half of the doctors (50.4%) who work in the internal medicine department during the COVID-19 pandemic experienced minimal anxiety, 31% of respondents experienced mild anxiety, 10.6% experienced moderate anxiety, and 8% experienced severe anxiety, using GAD-7 questionnaire [18].

Table 2. Frequency distribution of anxiety levels and reasons for anxiety

Variable	n (%)
Anxiety levels	
Minimum	84 (92.0)
Mild	6 (7.0)
Moderate	1 (1.0)
Severe	0 (0.0)
Reasons for anxiety	
Health	9 (10.0)
Academic	19 (21.0)
Family	3 (3.0)
Others	4 (4.0)
Unknown	56 (62.0)

According to this study, the respondents expressed more significant concerns about academic matters rather than their health, including worries about contracting COVID-19. This could happen because Aceh has become a COVID-19 yellow zone due to a decrease in daily incidence, an increase in the number of recovered patients, and a decrease in death cases in the last two weeks, this happened during a study in October 2021. These findings were supported by research in Pakistan which found that the anxiety that occurs in health workers can be caused by the demands of work as health workers, such as direct contact with patients during the COVID-19 pandemic. The demands of a health worker's duties will trigger anxiety about the risk of experiencing transmission of the virus to themselves or their families. The high mortality rate for health workers treating COVID-19 can also cause anxiety for health workers [19].

Data in Table 3 shows that most respondents did not suffer from GERD. Likewise, the prevalence of GERD among 515 doctors in Indonesia is 27.4%, assessed using the GERD-Q. Meanwhile, 72.6% of respondents had a GERD-Q score below eight, which means they have a low probability of suffering from GERD. Another 15 studies conducted in Saudi Arabia showed that 40% of respondents experienced a burning sensation before the COVID-19 pandemic, but the number increased during the COVID-19 pandemic to 49.6%. The prevalence of GERD during the COVID-19 pandemic was higher (34.2%) than before the COVID-19 pandemic, which was 24.8% [20].

Doctors have been recognized as a profession with long working hours and heavy workloads, which may affect their eating habits. Several studies report that unhealthy eating patterns, shift work, and obesity in the medical profession may contribute to the incidence of GERD. The severity of gastrointestinal disorders can be influenced by psychological factors and changes in pain perception through activity on the brain-gut axis, which is also true for GERD. Several studies have confirmed the relationship between GERD and psychological health. There may be a close connection between the digestive tract and the brain through physiological mechanisms. For example, stress and emotional states can affect gastrointestinal function leading to gastrointestinal disease [7]. Previous studies have shown that the factors associated with the incidence of GERD in resident doctors during the COVID-19 pandemic are the burden factors of education, diet, and psychosocial economy [21].

Table 3. Frequency distribution of GERD

Category	n (%)
Suggestive GERD	9 (9.9)
No GERD	82 (90.1)

This study assessed the typical symptoms (heartburn and regurgitation) and atypical symptoms (nausea, sleep disturbances at night, abdominal pain, and consumption of additional drugs) to determine the possibility of GERD. Based on the data in Table 4, the majority of respondents experienced typical symptoms of regurgitation (14%) and heartburn (7%), while the non-typical symptoms felt by respondents were difficulty sleeping due to heartburn and also the consumption of additional drugs by 10%. Previous research reported positive symptoms associated with GERD, 45.5% of the participants reported experiencing

heartburn, 40.4% had regurgitation, and 39% experienced sleep disturbances due to heartburn and regurgitation. Additionally, 18.2% of the respondents used medication to alleviate heartburn and regurgitation within the past week. Regarding negative symptoms, most respondents did not experience epigastric pain, with 54.8% reporting no such symptoms in the previous week. Similarly, 61% of the participants did not report experiencing nausea during the same period [22]. Another study of 1,031 GERD patients was included, consisting of 572 males and 459 females. The most commonly reported main complaint among the patients was heartburn, observed in 61% of the cases. When considering all symptoms, heartburn and regurgitation were the most prevalent, with respective rates of 82.4% and 58.8% [23].

Table 4. GERD symptom frequency distribution based on GERD-Q results

GERD symptom	Score frequency for symptom			
	0 day	1 day	2-3 days	4-7 days
Heartburn	85 (93%)	6 (7%)	0 (0%)	0 (0%)
Regurgitation	78 (86%)	9 (10%)	3 (3%)	1 (1%)
Epigastric pain	74 (81%)	15 (16%)	1 (1%)	1 (1%)
Nausea	74 (81%)	13 (14%)	3 (3%)	1 (1%)
Sleeping problem	82 (90%)	8 (9%)	1 (1%)	0 (0%)
Consumption of additional drugs	82 (90%)	7 (8%)	1 (1%)	1 (1%)

The data in Table 5 shows that the majority of respondents in this study had a good quality of life. Similarly, the results of this study are consistent with previous studies using the World Health Organization Quality of Life - BREF (WHOQOL-BREF) instrument. The study found that 46.7% of respondents had a good quality of life, 35.6% of respondents had a moderate quality of life, and 3.3% had a poor quality of life during the COVID-19 pandemic [24]. During the COVID-19 pandemic, several factors can affect changes in a person's quality of life which are called coping abilities. When a person's coping skills improve, the person's quality of life also improves. Positive coping strategies are approaches or techniques that enhance an individual's quality of life [25].

Table 5. Quality of life frequency distribution

Quality of life	n (%)
Very good	15 (16.5)
Good	47 (51.6)
Moderate	25 (27.5)
Poor	3 (3.3)
Very poor	1 (1.1)

Based on the results of the data analysis in Table 6, statistical tests using the contingency coefficient test obtained a p-value of 0.001 (<0.05) and r of 0.360 (0.20-0.399). This study showed a significant relationship with a weak correlation between anxiety levels and the prevalence of GERD in Specialist Doctor Education Program participants during the COVID-19 pandemic. The results of this study are consistent with previous studies that reported that GERD patients with and without chest pain experienced anxiety rates of 24.7% and 35.17%, respectively. The severity of gastrointestinal disorders can be influenced by psychological factors and changes in pain perception through activity on the brain-gut axis, which also applies to GERD [7]. Another study found that 85% of respondents had gastrointestinal symptoms during the COVID-19 pandemic. This study found that there was a significant relationship between anxiety levels during the COVID-19 pandemic and gastrointestinal complaints that occurred, with a p-value of 0.002 [26]. Observational studies have demonstrated a link between GERD and anxiety disorders [27]. The meta-analysis study, which involved 1,485,268 participants from 9 studies, demonstrated an inverse relationship of this result. Research that focused on psychosocial disorders as the endpoint discovered a higher prevalence of psychosocial disorders in individuals with GERD in comparison to those who did not have GERD [28].

The following mechanism explains the relationship between psychological factors such as anxiety and clinical manifestations caused by GERD. Certain psychological conditions such as anxiety can cause an increase in gastric acid reflux by reducing pressure on the lower esophageal sphincter, changing esophageal motility, or increasing gastric acid secretion [29].

The imbalance of the parasympathetic and sympathetic autonomic nervous pathways that can occur directly or indirectly, together or separately, affects the gastrointestinal tract by affecting the secretion of gastric acid, vascularization, and motility [30]. Elevated levels of gastric acid can lead to the backflow of gastric contents into the esophagus. Additionally, when the esophageal sphincter relaxes, it can result in the

movement of stomach contents into the pharynx, nasopharynx, and mouth. The heightened gastric acid contributes to the development of GERD's underlying pathology [31].

Table 6. Relationship between anxiety levels with GERD-Q results

Anxiety Level	No GERD		GERD Suggestive		Total		<i>r</i>	p-value
	n	%	n	%	n	%		
	Minimum	78	92.9	6	7.1	84		
Mild	4	66.7	2	33.3	6	100.0		
Moderate	0	0	1	100.0	1	100.0		
Severe	0	0	0	0	0	0		

Table 7 shows the statistical test using the contingency coefficient test obtained with a p-value of 0.028 (<0.05) and an *r* of 0.327 (0.20-0.399). Thus it can be concluded that there is a significant relationship with a weak correlation strength between the prevalence of GERD and the quality of life of Specialist Medical Education participants during the COVID-19 pandemic. Previous studies also supported the finding, which reported that among the 1,009 medical students, 33% identified as having a high risk or GERD, while 67% were categorized as having a low risk or probability. Heartburn (41.7%) and regurgitation (32.2%) were the most frequently reported symptoms [32]. Heartburn at night can also cause difficulty sleeping and interfere with work the next day. Nocturnal awakenings occur daily in GERD patients, and their chronicity can be predicted by the presence of insomnia, sleep dissatisfaction, difficulty initiating sleep, and various other medical disorders [33]. The research investigating the impact of GERD on the quality of life in GERD patients revealed that the frequency of reflux symptoms and stress negatively influence the health-related quality of life (HRQL). Moreover, it was observed that an increasing body mass index (BMI) and age were associated with a decline in physical function [34].

Table 7. Relationship between GERD-Q results and quality of life

GERD Prevalence	Quality of life										<i>r</i>	p-value		
	Very Good		Good		Moderate		Poor		Very Poor				Total	
	n	%	n	%	n	%	n	%	n	%			n	%
Likely not suffering from GERD	15	18.3	45	54.9	19	23.2	2	2.4	1	1.2	82	100.0	0.327	0.028
Chances of suffering from GERD	0	0	2	22.2	6	66.7	1	11.1	0	0	9	100.0		

Another study at Atma Jaya Hospital in Jakarta reported a significant relationship between a (GERD-Q) and patients' quality of life, with a p-value of 0.005. This indicates a correlation between GERD and the quality of life of patients. GERD can harm a person's quality of life, potentially affecting their work productivity and, as a result, reducing their income. Several factors contribute to the decline in quality of life among GERD patients, including age, family relationships, family support, diet variations across different countries, and lifestyle choices [10]. The previous study also showed that the impact on the quality of life (QoL) was significant, reaching severe levels (RQS® <16) for two-thirds of the patients [35].

4. CONCLUSION

This study found a significant relationship with weak correlation strength between anxiety levels and the prevalence of GERD in Specialist Doctor Education Program participants during the COVID-19 pandemic. A statistical test of the relationship between GERD prevalence and quality of life using the contingency coefficient test found a significant relationship with a weak correlation strength between the prevalence of GERD and the quality of life in Specialist Medical Education Program participants during the pandemic COVID-19. Furthermore, the findings in this study can be used to strengthen strategies to prevent poor quality of life for healthcare workers during the pandemic situation. It is highly recommended that relevant institutions prioritize evaluating mental and physical health among Specialist Medical Education Program participants. This strategy can optimize the education and work processes, ultimately fostering the development of a healthy workforce at the forefront of healthcare. This evaluation should encompass regular assessments and support systems to ensure the well-being of healthcare professionals and provide them with

the necessary resources to cope with the challenges they face. Additionally, implementing measures to promote a healthy work-life balance and providing access to mental health support services can significantly contribute to participants' overall well-being.

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BIOGRAPHIES OF AUTHORS






Desi Maghfirah    is an internist. She completed her study at internal medicine specialist program, Syiah Kuala University, in 2015. She has been a lecturer at the Faculty of Medicine, Syiah Kuala University, since 2016. She feels happy to share her knowledge and experience with the student and to be a part that plays a role in advancing her alma mater. She has been actively researching since 2018 and focuses on internal medicine and especially in the field of gastroenterohepatology. She can be contacted at email: desimaghfirah@usk.ac.id.






Muhammad Yusuf    started his education at the Faculty of Medicine, Syiah Kuala University in 1997 and was appointed as a full-time lecturer at the Faculty of Medicine, Syiah Kuala University, in 2006. He completed his studies in General Education Specialist Surgery in 2012. The author proceeds to Sub-Specialist in Digestive Consultant Surgery in Bandung from 2015 to 2016 and back to the Faculty of Medicine of Syiah Kuala University and Dr. Zainoel Abidin General Hospital as a Consultant of Digestive Surgery in 2017. He can be contacted at email: Yusufsurgeon@gmail.com.






Subhan Rio Pamungkas    completed his M.D. degree from the Medical Faculty of Universitas Syiah Kuala. In 2011, he completed his education as a Psychiatrist and a Sub-Specialist in Child and Adolescent Psychiatry in 2018 at the Medical Faculty of Universitas Indonesia, Jakarta. He has been a lecturer in the Psychiatry Department, Medical Faculty of Universitas Syiah Kuala, Aceh, Indonesia, since 2006. He also works as a child and adolescent psychiatrist at Aceh Mental Hospital, and Dr. Zainoel Abidin General Hospital, in Banda Aceh. He has followed some research training and research, especially in mental health. He also has been actively writing about psychiatry. He can be contacted at email: subhanriop@usk.ac.id.






Sarah Firdausa    has been a lecturer in the Internal Medicine Department, Syiah Kuala University, since 2008. In 2012, the author continued her postgraduate study at the Faculty of Medicine, International Islamic University Malaysia in Kuantan, Malaysia, majoring in Physiology. Then she pursued the Internal Medicine Specialist at Airlangga University, Surabaya, in 2017. She came back to Aceh in September 2017 and started to actively participate in the teaching and learning process at the Faculty of Medicine, Syiah Kuala University, and serve the patients in RSUD dr. Zainoel Abidin, Banda Aceh. She has been active in writing since 2007; she has researched internal medicine and interprofessional medicine collaboration. She can be contacted at email: sarahfirdausa@usk.ac.id.



Muhammad Ridho Akbar Eljatin    is a clinical clerkship student in the Faculty of Medicine, Syiah Kuala University, since 2022. He received a Bachelor of Medicine from Syiah Kuala University in 2022. Since the preclinical period, he has been actively involved in student activities and has been a lecturer assistant in conducting research and preparing medical student textbooks. He can be contacted at email: ridhoakbar@usk.ac.id.



Sherina Arfi Febriyanti    successfully completed her Bachelor of Medicine degree at Syiah Kuala University in the year 2022. Currently, she is actively engaged as a clinical clerkship student in the Faculty of Medicine at Syiah Kuala University. She can be contacted at email: sherina.af @usk.ac.id.