

Analysis of the Emergency Level of Pediatric Covid 19 Patients in the Emergency Room at Gambiran Hospital, Kediri

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ABSTRACT

Infection in pediatric will affect the child's growth and development. Cases of respiratory infections that occurred due to the spread of the Covid 19 virus in 2019-2022 are often reported as the highest cause of death in cases of infection. The aim of this research is to analyze the factors that influence the level of emergency due to Covid-19 in children. This research is correlational analytical research. Respondents were 52 children. The results of the bivariate analysis test show a relationship between the emergency level of Covid 19 patients admitted to the emergency room and the nutritional status variables, signs of respiratory and the incidence of diarrhea. The factor most related to the level of emergency in Covid-19 children from the diarrhea. The incidence of diarrhea is caused by an infectious process that has spread and affected the digestive tract in children. Severe Diarrhea can causes dehydration and electrolyte abnormalities.

Keywords: covid 19, emergency level, pediatric

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BACKGROUND

Infections in children often cause emergencies if specific treatment is not immediately provided. Infection in children will affect the growth and development of children (Padila et al., 2022). Cases of respiratory infections that occurred due to the spread of the Covid 19 virus in 2019-2022 are often reported as the highest cause of death in cases of infection in children (Shin et al., 2023). Exposure to SARS-CoV-2 from unknown sources or from sources outside the child's family accounts for 55% of cases of infection.

COVID-19 initially appears as a mild respiratory illness, progressing to viral interstitial pneumonia, which can further progress to acute respiratory distress syndrome and multiple organ failure in 10-15% of adults (Michael et al., 2020). Complications due to impaired respiratory function in children with Covid 19 can cause acute respiratory distress syndrome (20-41%) (Piluso et al., 2023). The spectrum of disease varies greatly from asymptomatic cases to mild, moderate and severe cases. Therefore, diagnosis based on how the patient first presents to the hospital is challenging, as the symptoms can range from a simple upper respiratory tract infection to pneumonia. or complete septic shock and hyperinflammatory response (Jamjoom, 2021). Cough is the second most common complaint after fever. This is because the COVID-19 virus will cause respiratory disease (Piluso et al., 2023). A total of 12% of children appeared ill, and 54% had a temperature of at least 37.6°C. Common symptoms were coughing (in 44% of patients) and not wanting to eat or difficulty eating (in 23%), the latter being more common in children under 21 months of age. Fever, cough, or shortness of breath occurred in 28 of 54 febrile patients (52%) A total of 4% of children had oxygen saturation values (as measured by pulse oximetry) less than 95%; all of these patients also had imaging evidence of lung involvement. Of the 9 patients who received respiratory assistance (Piluso et al., 2023).

Gambiran Regional Hospital has treated 95 pediatric patients with Covid 19 (March 2020-May 2022) with various degrees of emergency during the patient's admission to the ER. Child patients with Covid-19 have a wide variety of clinical manifestations, ranging from mild to severe. These various conditions influence the level of emergency when the child must be treated in the emergency room when their health condition declines. There are many factors that influence the level of emergency for pediatric patients with Covid-19 when they enter the emergency room.

Based on the varying levels of emergency conditions in children when undergoing treatment in the emergency room due to declining health conditions due to Covid 19, this research focuses on looking for factors related to the level of emergency conditions based on data collected during the assessment and results of supporting examinations in children with Covid 19 who were treated. carry out treatment in the Emergency Room at Gambiran Regional Hospital, Kediri City.

METHODS

This research is included in correlational analytical research with a retrospective cohort approach where data is taken from secondary data from patient medical records in the form of reports of triage results and results of assessments by health workers and supporting examinations while in the emergency room for children with Covid 19 in March 2020. - August 2022. The number of samples in this study was 52 respondents with data collection using consecutive sampling to obtain data that was in accordance with what the researchers needed. The dependent variable in this study is the emergency level of patients entering the emergency room (based on priority assessment using ATS (Australian Triage Scale) while the independent variables are the factors that cause the emergency level of Covid 19 patients in the emergency room (nutritional status, risk of infection, signs of distress respiratory

condition, diarrhea, duration of illness and history of previous illness). After the data is collected, the data will be carried out an analysis test by previously carrying out a bivariate Spearman Rank Rho analysis test and a linear regression test to see the most dominant factors.

RESULTS

Based on the research results, the mean age of respondents was 4.29 (Min-max 1-16 years) with SD (3.426).

Table 1. Results of bivariate analysis of emergency level factors for pediatric patients with Covid 19 in the emergency room at Gambiran Regional Hospital

No	Variabel	P Value	Correlation coefficient
1	Nutritional status	0,011	0,348
2	Tanda distress pernapasan	0,000	-0,557
3	Diarrhea condition	0,05	3,81
4	Long illness	0,554	-
5	Previous history of illness	0,164	-

Based on table 1, it shows the p-value of the results of bivariate analysis for each variable with the emergency level of Covid-19 pediatric patients in the emergency room. It was found that there was a relationship between nutritional status (p value = 0.011, R = 0.384), signs of respiratory distress from chest x-rays. Lateral PA (p value = 0.000, R = -0.557) and the incidence of diarrhea (p value 0.05, R = 3.81) with the emergency level of children with Covid 19.

Based on table 1, the results of the bivariate analysis of length of illness and history of previous illness are more than alpha (p value < 0.05), so it can be concluded that these 2 variables are not related to the level of emergency, so they are not discussed in depth in this article.

DISCUSSION

The relationship between nutritional status and the level of emergency in children with Covid 19

Based on the research results, it was found that there was a relationship between nutritional status and the level of emergency in children with Covid 19. Calculation of nutritional status in this study used 2 indicators, namely Body Weight (BW) and Age (U). The formula for determining nutritional status used the Z Score formula. The results of research on nutritional status are divided into 3 categories, namely Normal, Less and More. Based on the research results, most (63%) of the respondents in this study had normal nutritional status.

Nutritional status is closely related to the health condition of every human being (IDAI, 2020). Poor nutritional status of a child is a risk factor for a child being susceptible to infection. The body's immunity is closely related to whether or not a child's nutritional intake is sufficient, which has a direct effect on their nutritional status and immune system. The results of the research showed that children with poor nutritional status were accompanied by those who experienced Covid-19 infection at an emergency level of first priority, this was caused by children with poor nutritional status and a low immune system so they were very vulnerable to infection and deterioration due to illness and a compromised immune system low.

The relationship between signs of respiratory distress (lateral PA thorax photo) and the level of emergency in children with Covid 19

Based on the research results, it was found that there was a relationship between signs of respiratory distress based on objective data in the form of lateral PA chest images and the child's emergency level with Covid 19 with a p value = 0.000 R = -0.557. The category of signs of respiratory distress from reading the PA lateral chest image when the patient first entered the ER was divided into 2, namely the presence of a picture of pneumonia and the absence of a picture of pneumonia. The chest photo was chosen in this study as a marker of respiratory distress because in accordance with the guidelines for managing Covid-19 patients, a supporting examination in the form of a lateral PA chest photo must be carried out to assess the condition of the respiratory tract.

SARS-CoV-2 is included in the beta-coronavirus group which infects the human respiratory system. In pneumonia, chest X-ray examination is the gold standard for making a diagnosis. Using a chest X-ray will show images in the form of infiltrates to consolidation with air bronchograms, bronchogenic and interstitial spread as well as cavity images. Radiological features of pneumonia caused by viruses may show: bilateral opacities, subsegmental consolidation, lobar or collapsed lungs or nodules, ground-glass appearance. In the early stages, multiple small plaque shadows with clear interstitial changes are visible in the lung periphery and then develop into multiple ground-glass shadows and infiltrates in both lungs. In severe cases, lung consolidation and even "white-lung" and pleural effusion (rare) may be found.

Based on the research results, almost all patients (94%) who responded to the lateral PA chest image had bilateral pneumonia. The type of pneumonia associated with COVID-19 is almost always in both lungs simultaneously (bilateral). Interstitial tissue is what surrounds the air sacs, blood vessels, and airways of your lungs. Interstitial lung disease causes scarring or other lung damage. Bilateral interstitial pneumonia in COVID-19 is lung damage on both sides due to pneumonia associated with COVID-19. This usually occurs after the initial (infectious) phase, often in people who have long COVID (post-acute sequelae of SARS CoV-2, or PASC).

The SARS-CoV-2 virus mainly spreads through infectious droplets that enter the body through mucous membranes. The S protein of the corona virus attaches to and hijacks the human angiotensin-converting enzyme 2 (ACE2) receptor which is expressed in the lungs, heart, kidneys and intestines. The S protein then undergoes structural changes that cause the virus cell membrane to fuse with the host cell membrane. Symptoms of COVID-19 infection appear after an incubation period of 1 to 14 days with an average of 5.2 days. The concentration of the SARS-CoV-2 virus from the upper respiratory tract will peak from the first week of symptoms (Fatoni, 2021).

COVID-19 initially appears as a mild respiratory illness, progressing to viral interstitial pneumonia, which can further progress to acute respiratory distress syndrome and multiple organ failure in 10-15% of adults (Michael et al., 2020). Complications due to impaired respiratory function in children with Covid 19 can cause acute respiratory distress syndrome (20-41%) (Piluso et al., 2023). The spectrum of disease varies greatly from asymptomatic cases to mild, moderate and severe cases. Therefore, diagnosis based on how the patient first presents to the hospital is challenging, as the symptoms can range from a simple upper respiratory tract infection to pneumonia. or complete septic shock and hyperinflammatory response (Jamjoom, 2021). Cough is the second most common complaint after fever. This is because the COVID-19 virus will cause respiratory disease (Piluso et al., 2023). A total of 12% of children appeared ill, and 54% had a temperature of at least 37.6°C. Common symptoms were coughing (in 44% of patients) and not wanting to eat or difficulty eating (in 23%), the latter being more common in children under 21 months of age. Fever, cough, or shortness of breath occurred in 28 of 54 febrile patients (52%) A total of 4% of children had oxygen saturation values (as measured by pulse oximetry) less than 95%; all of

these patients also had imaging evidence of lung involvement. Of the 9 patients who received respiratory assistance (Piluso et al., 2023).

The relationship between the incidence of diarrhea and the level of emergency in children with Covid 19

Based on the research results, it was found that there was a relationship between the incidence of diarrhea and the level of emergencies in children with Covid 19 with a p value = 0.005. The incidence of diarrhea is a gastrointestinal (GI) symptom as a common symptom in COVID 19 patients (Grimire et al., 2021). Diarrhea is common in COVID-19 infection. This is reported in approximately 10% to 20% of cases. This is recognized as one of the symptoms that arise from this infection. This diarrhea is believed to be caused by local invasion of the virus through the angiotensin-converting enzyme-2 receptor, which is widely found in the gastrointestinal mucosa, especially in the stomach and small intestine. This virus is often excreted in feces (Friedel et al., 2023).

Based on the research results, most patients (54%) said their children experienced diarrhea when they were sick (Kristianti, 2021). Some patients with COVID-19 experience gastrointestinal (GI) symptoms such as diarrhea, vomiting and stomach pain. In addition, various studies report that the human receptor for COVID-19, namely the angiotensin-converting enzyme 2 (ACE2) receptor, is expressed in small intestinal epithelial cells. For two days, then diarrhea on the 2nd day of admission to the hospital. Although the main manifestation of COVID-19 patients is fever and sometimes respiratory symptoms, many case reports show that the percentage of patients experiencing gastrointestinal (GI) symptoms varies, and the overall range varies from 2% to 79.1% (Juthi et al., 2023). These symptoms can appear at any time during COVID-19 infection, at the beginning or after the onset of fever, or even afterward. The most common GI symptoms include diarrhea, lack of appetite, nausea, vomiting, and sometimes abdominal pain and in severe cases, patients experience bleeding in the gastrointestinal tract (GIT) (Juthi et al., 2023).

One of the mechanisms by which SARS-CoV-2 damages the intestinal tract is through an inflammatory response that causes diarrhea, and the main cause of this 'inflammatory storm' is excessive cytokine release and immune dysregulation (Liu et al., 2020). Intestinal inflammation may trigger COVID-19-associated diarrhea through several mechanisms, including reduced reabsorption of bile acids secreted in the terminal ileum. Bile acids are the main organic substances of bile that are absorbed in the distal small intestine and then return to the liver, being re-secreted from there, which is known as circulatory enteropathy. During this process, only 5% of the total bile acids are lost during defecation, which means the process is correct (Ticho et al., 2019). There is a bile acid absorption system on the apical epithelial surface of the intestinal epithelium which is controlled by apical sodium-dependent bile acid transporters (Juthi et al., 2023).

CONCLUSION

Based on the research results, there are 3 factors that influence the emergency level of Covid-19 patients in the ER at Gambiran Regional Hospital, namely nutritional status, signs of respiratory distress in the form of lateral PA thorax photographs and the incidence of diarrhea. The factor that most influenced the level of emergency for Covid-19 children in this study was the incidence of diarrhea. The incidence of diarrhea is caused by an infectious process that has spread and affected the digestive tract in children who enter the emergency room, thereby worsening the condition and causing an emergency condition and receiving first priority treatment. Diarrhea is severe and causes dehydration and electrolyte abnormalities. This disorder will disrupt blood circulation, causing the risk of hypovolemic shock, requiring intravenous hydration, electrolyte replenishment, and rarely requiring hemodialysis for acute kidney failure.

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