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The relationship between q-SOFA score and mortality of sepsis patients at Jogja Hospital

Ardi Pramono[1], Basuki Rahmat[2], Jessenia Eldora Nurchalifah[3], Shania Ardelia Geofany[4]
[1]Department of Anesthesia and Intensive Therapy, Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia
[2]Department of Anesthesia and Intensive Therapy, Jogja Hospital, Yogyakarta, Indonesia
[3,4]School of Medicine, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia

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ABSTRACT

Sepsis and severe sepsis are the leading causes of death in critically ill patients admitted to intensive care units (ICUs) in the United States. The national economic burden for sepsis in Indonesia at 100,000 patients is estimated to reach USD 130 million. Currently, screening for patients who may have sepsis has also been used frequently. The assessment can be done with a qSOFA score measurement (quick SOFA) or rapid measurement. This study used a retrospective with secondary data from medical records of patients treated in the intensive care unit of Jogja Hospital from January through December 2023. The subjects of 62 patients suffering from sepsis were obtained, with 25 patients (40.3%) at low-risk qSOFA values and 37 (59.7%) at high-risk qSOFA values. The results of this study stated that there was no relationship between the patient's qSOFA score when admitted to the hospital and the mortality of sepsis patients in the intensive care unit of the Jogja Hospital ($p>0.07$). Thus, the results of this study provide important insights for clinical practitioners in evaluating and planning the treatment of sepsis patients, considering that qSOFA, although useful as an initial screening tool, should not be used as the sole factor in clinical decision-making regarding the management of sepsis patients.

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Corresponding Author:

Ardi Pramono,
Department of Anesthesia and Intensive Therapy,
Faculty of Medicine and Health Science,
Universitas Muhammadiyah Yogyakarta,
Brawijaya Street, Geblagan, Tamantirto, Kasihan, Bantul, Special Region of Yogyakarta, 55183, Indonesia
Email: ardipramono@umy.ac.id

INTRODUCTION

Sepsis and severe sepsis are the leading causes of death in critically ill patients admitted to intensive care units (ICUs) in the United States (Saraswati et al., 2016), (Wati, Hartawan, Suparyatha, Mahalini, & Pratiwi IGAPE, 2019). The national economic burden for sepsis in Indonesia at 100,000 patients is estimated to reach USD 130 million. Of the 41.7% of patients who survived and 58.3% who died from sepsis, the average hospital costs incurred per surviving and deceased sepsis patient were USD 2,1,011 and USD 1,406, respectively. Patients with sepsis with

multifocal infections and lower respiratory tract infections are estimated to be the two with the highest economic burden (Purba et al., 2020), (Sari, 2023). A meta-analysis study by Jawad et al. found that the incidence of sepsis in the population ranged from 22 to 240 cases per 100,000 people, severe sepsis 13-300 cases per 100,000 people, and septic shock 11 cases per 100,000 people, with mortality rates reaching 30% for sepsis, 50% for severe sepsis, and 80% for septic shock (Purwanto & Astrawinata, 2018). Sepsis is an organ dysfunction caused by a regulatory disorder of the body's response to infection. The body's reaction causes damage to its tissues and organs. It can lead to shock, failure of many organs, and sometimes death, especially if not recognized early and treated immediately (I. M. P. Putra, 2018).

Organ dysfunction in sepsis can be identified as an acute change as a consequence of infection formulated in the sequential (sepsis-related) organ failure assessment (SOFA) score ≥2 or qSOFA tested positive when 2 of the 3 criteria are present (Idris, 2018), (Purwanto & Astrawinata, 2018). Currently, screening for patients who may have sepsis has also been used frequently. The assessment can be carried out with a SOFA score that has a high predictive validity, (Koch et al., 2020) (I. M. P. Putra, 2018). In addition to the SOFA score, another assessment that can be performed is the qSOFA measurement (quick SOFA) or SOFA rapid measurement (Habiburrahman & Putra, 2023). This measurement consists of a respiratory rate of >22 breaths per minute, a change in mental status/consciousness, and systolic blood pressure<100 mmHg. The qSOFA measurement does not require laboratory tests and can be quickly and easily assessed repeatedly. This makes it easy to apply, (Putra, 2019) (Ersyaputri, 2023) . The qSOFA criteria can be used as a risk stratification tool in settings with limited resources to identify infected patients at an increased risk of death (Tiwari et al., 2023). Patients are at high risk of worsening if they have two or more of the 3 clinical criteria. A qSOFA test can be carried out to detect the tendency to sepsis followed by SOFA (I. A. S. Putra, 2019). This study aims to determine whether there is a relationship between qSOFA score and mortality in sepsis patients at Yogyakarta City Hospital.

RESEARCH METHOD

This study used a sample of medical records of patients treated in the intensive care unit of Yogyakarta City Hospital from January through December 2023. The independent variable in this study was the qSOFA score of sepsis patients, while the bound variable was the mortality of sepsis patients. In this study, data processing using SPSS with a chi-square test compared the relationship between qSOFA value and mortality of sepsis patients at Yogyakarta City Hospital. The results of the statistical test were considered meaningful when a p < value of 0.05 was obtained.

RESULTS AND DISCUSSIONS

In this study, a subject of 62 patients suffering from sepsis was obtained. There were 25 patients (40.3%) with low-risk qSOFA values and 37 (59.7%) with high-risk qSOFA values (Table 1). To find the relationship between qSOFA score and mortality in sepsis subjects, a chi-square statistical test was carried out with no significant relationship (p>0.05). The result means that there was no significant relationship between qSOFA and Final Status (Dead/Alive) (Table 2).

Table 1. Characteristic of subject based on qSOFA

q SOFA	n	Percent (%)
Low Risk	25	40.3
High Risk	37	59.7
Total	62	100

Table 2. Relationship between qSOFA score and mortality

	Death		Alive		Total		p
	n	%	n	%	n	%	
Low Risk	16	25.8	9	14.5	25	40.3	0.07
High Risk	31	50	6	9.7	37	59.7	
Total	47	75.8	15	24.2	62	100	

The study data showed that most sepsis patients had a high-risk qSOFA score of 37 (59.7%), and most sepsis patients died (75.8%). From the results of cross-tabulation, the largest score was obtained for high-risk sepsis patients with a final death status, which was 31 subjects (50.0%). The number of sepsis patients who died was higher than that of alive patients in both low-risk and high-risk qSOFA score groups, and the results of statistical tests showed that there was no significant relationship between qSOFA score and the outcome or final status of sepsis patients (dead/alive) at Jogja Hospital. This is in line with the research of Vivianni (2016), which stated that there was an insignificant relationship between qSOFA scores and the incidence of death of sepsis patients at Dr. Kariadi Semarang Hospital (Vivianni & Farhanah, 2016).

The qSOFA scoring system, while simple to use with only three parameters, can introduce bias. For instance, symptoms like altered mental state (AMS) and tachypnea can be present in various non-infectious neurological diseases. However, even a small suspicion of infection can result in a positive qSOFA score, potentially leading to a sepsis label for the patient unless the doctor determines otherwise. Non-infectious conditions can present with clinical suspicion of infection, for example, acute exacerbation of COPD with CO2 narcosis, dysuria in women of reproductive age, chronic allergic cough, and many more; patients with acute heart failure, or pulmonary thromboembolism or unexpected cases of poisoning may present with hypotension, tachypnea and may even have an altered mental status. Simple cases of ruptured ectopic pregnancy can present with abdominal pain, hypotension, and tachypnea. In such a situation, a positive qSOFA score will be easily fulfilled. It also risks delaying the identification of the true cause of the disease. Thus, we can say that the lack of sensitivity and specificity is the main drawback of the qSOFA score, which completely beats its previously mentioned advantages (Li et al., 2024).

qSOFA consists of three components: changes in mental status, low blood pressure, and rapid respiratory rate. This score is designed to detect patients at high risk of severe sepsis or septic shock, but it does not cover other aspects of sepsis, such as a broader systemic inflammatory response. The qSOFA only provides a limited picture of the patient's condition at the scoring time and does not describe progress during treatment. In addition, the qSOFA value inaccurately predicts mortality due to a GCS (Glasgow Coma Scale) value that depends on a person's age and acuity level when calculating GCS. GCS is not an easy-to-use tool for these vulnerable patients, nor is it a determinant of changes in mental status in patients with dementia. GCS has been reported to be problematic as a criterion in sepsis decision-making in patients with stroke, encephalitis, intoxication, hypoxemia, and hypercapnia or patients receiving procedural analgesics. GCS is most lost in elderly patients, especially in patients with dementia and in patients with the highest level of acuity. This shows that assessing GCS is not an easy task for patients. Alternatively, lactate may be beneficial in sepsis patients where GCS is difficult to assess because lactate is an indicator of hypoperfusion that is strongly correlated with sepsis (Askim et al., 2017).

Comorbid conditions or other comorbidities not assessed by qSOFA may affect the patient's prognosis. The results of Saputra's (2015) research said that comorbidities affect the course of sepsis until death occurs and one of the other factors that play a role in the death of patients with sepsis. Previous research has also mentioned chronic comorbid conditions that alter immune function, such as chronic kidney disorders, diabetes mellitus, HIV, and alcohol abuse, which are more common in sepsis patients. Chronic obstructive pulmonary disease (COPD) is one of the diseases that can cause respiratory failure, especially in patients with sepsis. Patients with COPD

will experience not only lung failure but also heart and other organs (Liao et al., 2015). In addition to diseases related to respiratory obstruction, patients with end-stage renal disease who undergo hemodialysis are prone to sepsis or infection. From 7 years of follow-up data, sepsis conditions were found in 11.7% of patients with hemodialysis and 9.4% of patients with peritoneal dialysis. It is associated with repeated exposure of hemodialysis patients with invasive procedures that allow for a port de-entry of microorganisms (Dellinger et al., 2013).

Diabetes is associated with increased susceptibility to infection and sepsis. Neutrophil chemotaxis, adhesion, and intercellular killing are host response abnormalities associated with hyperglycemic effects and predisposition to infection. Long-term chronic hyperglycemia can trigger organ failure, especially kidneys, nerves, heart, eyes, and blood vessels, which results in a 17-fold risk of organ failure compared to patients who do not have diabetes. In the 2012 Surviving Sepsis Campaign, it was stated that controlling plasma glucose is one of the things that needs to be done to maximize the effects of other sepsis therapies. Intravenous glucose administration and insulin control to maintain blood glucose <180 mg/dl are vital in the management of patients with sepsis (Abou Dagher et al., 2015).

The older the age, the higher the likelihood of the patient dying. This is because in the elderly's condition, there will be a decrease in the immune system, and the body is unable to fight incoming pathogens, so the decline in immunity will make it easier for elderly patients to experience worsening conditions and die. This is in line with the results of a study conducted by Epstein et al., which stated that deaths in septic patients are most experienced at the age of 65 years and above (Epstein et al., 2016). In addition, another statement from a study stated that it is certain that there are as many as 400,000 patients with infections coming to the hospital with an age range of 45 years and above with an increasing mortality rate (Donnelly et al., 2017). From some of these references, it can be concluded that age is related to the mortality of sepsis patients, where patients who reach the age of elderly adulthood are more vulnerable compared to young people. It can provide a better inflammatory response at a young age than in old age.

The qSOFA score assessor is not a one-time assessment at the beginning of a series. The qSOFA is an assessment tool used to determine the risk of death in patients with sepsis based on three main parameters: systolic blood pressure ≤100 mmHg, respiratory rate ≥22 per minute, and significant changes in mental status (such as decreased consciousness). These three parameters tend to change. Serial assessments provide an additional advantage by providing a dynamic picture of the patient's condition and enabling continuous monitoring to improve treatment outcomes. Ideally, a combination of these two methods should be used, where the initial assessment is aimed at rapid identification while the qSOFA assessment and serial monitoring are for change detection. This will provide a more comprehensive approach to the management of sepsis patients. Some studies show that other scores, such as the SOFA (Sequential Organ Failure Assessment), are more accurate in predicting mortality in sepsis than QSOFA, as the SOFA includes more parameters that reflect organ dysfunction.

A study by Giamarellos-Bourboulis et al. (2017) and Van der Woude et al. (2018), with a total of 3,542 patients, showed that qSOFA had a lower ability in early risk assessment and identified patients with a high risk of death when compared to SIRS. First, qSOFA is designed and tested to be applied to patients suspected of having an infection, not to distinguish between patients who have an infection and those who do not. Second, the mental status assessment can vary and be influenced by the situation, affecting the validity of qSOFA. Third, qSOFA does not include serum lactate rates proposed as a screening tool for sepsis (Sari, 2019).

Sepsis is an organ dysfunction due to impaired regulation of the body's response to infection. The condition of sepsis is a disorder that causes death. The clinical criterion for identifying septic shock is the presence of sepsis with persistent hypotension that requires a vasopressor to maintain a mean arterial pressure (MAP) ≥ 65 mmHg, with a lactate level of ≥ 2 mmol/L despite adequate fluid resuscitation. The body's reaction causes damage to its tissues and

organs. It can lead to shock, failure of many organs, and sometimes death, especially if not recognized early and treated immediately (Irvan et al., 2018).

Early and rapid screening can be done in each Emergency Department (ER). The new criteria for sepsis use the Sequential Organ Failure Assessment (SOFA). The SOFA score includes 6 organ functions, namely respiration, coagulation, hepatic, cardiovascular, central nervous system, and kidney, selected based on a literature review, each of which has a value of 0 (normal function) to 4 (very abnormal), which gives a possible value from 0 to 24. The higher the SOFA score, the higher the morbidity and mortality of sepsis (Wiriansya et al., 2022). A qSOFA score of ≥2 indicates organ dysfunction. The qSOFA score is recommended for identifying high-risk patients for exacerbation and predicts the length of time the patient is admitted to either the ICU or non-ICU. Patients are assumed to be at high risk of exacerbation if there are two or more 3 clinical criteria (Sari, 2019).

The basic components of sepsis and septic shock management are initial resuscitation, vasopressor/inotropic, hemodynamic support, early antibiotic administration, source control of infection, diagnosis (culture and radiological examination), supportive management (ventilation, dialysis, transfusion), and infection prevention (Irvan et al., 2018). Implementing the 1-hour sepsis bundle is the latest Surviving Sepsis Campaign (SSC) recommendation for managing sepsis or sepsis shock. The 1-hour resuscitation bundle consists of Measuring blood lactate levels. Re-measure if initial lactate levels > 2 mmol/L. Take a blood sample for culture examination before administering Broad-spectrum antibiotics. Give 30 mL/kgBB of crystalloids if hypotension or lactate levels ≥ 4 mmol/L. Administration of vasopressors in a state of hypotension that fails to be overcome by fluid resuscitation (septic shock) so that the MAP pressure is≥ 65 mmHg. Post-evaluation of 30 mL/kgBB crystalloid administration: Pay attention to the balance of resuscitation fluid and adjust the vasopressor dose to repair/maintain adequate tissue perfusion while minimizing resuscitation of interstitial edema. Fluid responsiveness tests are commonly used as a guideline to determine whether the patient still needs additional fluids (Hartanto & Zulfariansyah, 2020).

CONCLUSION

The results of this study stated that there was no relationship between the patient's qSOFA score when admitted to the hospital and the mortality of sepsis patients in the intensive care unit of the Yogyakarta City Hospital. This is influenced by several factors, including age, comorbidities, qSOFA characteristics, and qSOFA assessment, which is only carried out once initially. Although qSOFA remains important as a rapid assessment tool, these results highlight the complexity of using the score to predict the sepsis outcome. Further research is needed to validate these findings and further understand the factors affecting sepsis patients' prognosis. It should be calculated in a series of qSOFA and SOFA scores to provide a more detailed picture of changes in patients' qSOFA scores and their relationship with mortality.

Thus, the results of this study provide important insights for clinical practitioners in evaluating and planning the treatment of sepsis patients, considering that qSOFA, although useful as an initial screening tool, should not be used as the sole factor in clinical decision-making regarding the management of sepsis patients. It is worth considering that thorough clinical assessment, including other measures of disease severity and response to therapy, remains crucial in managing sepsis.

References

Abou Dagher, G., Harmouche, E., Jabbour, E., Bachir, R., Zebian, D., & Bou Chebl, R. (2015). Sepsis in hemodialysis patients. *BMC Emergency Medicine*, *15*(1), 30. https://doi.org/10.1186/s12873-015-0057-y

Askim, Å., Moser, F., Gustad, L. T., Stene, H., Gundersen, M., Åsvold, B. O., Dale, J., Bjørnsen, L. P., Damås, J. K., & Solligård, E. (2017). Poor performance of quick-SOFA (qSOFA) score in predicting severe sepsis and mortality – a prospective study of patients admitted with infection to the emergency department. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*, *25*(1), 56. https://doi.org/10.1186/s13049-017-0399-4

Dellinger, R. P., Levy, M. M., Rhodes, A., Annane, D., Gerlach, H., Opal, S. M., Sevransky, J. E., Sprung, C. L., Douglas, I. S., Jaeschke, R., Osborn, T. M., Nunnally, M. E., Townsend, S. R., Reinhart, K., Kleinpell, R. M., Angus, D. C., Deutschman, C. S., Machado, F. R., Rubenfeld, G. D., … Moreno, R. (2013). Surviving Sepsis Campaign. *Critical Care Medicine*, *41*(2), 580–637. https://doi.org/10.1097/CCM.0b013e31827e83af

Donnelly, J. P., Safford, M. M., Shapiro, N. I., Baddley, J. W., & Wang, H. E. (2017). Application of the Third International Consensus Definitions for Sepsis (Sepsis-3) Classification: a retrospective population-based cohort study. *The Lancet Infectious Diseases*, *17*(6), 661–670. https://doi.org/10.1016/S1473-3099(17)30117-2

Epstein, L., Dantes, R., Magill, S., & Fiore, A. (2016). Varying Estimates of Sepsis Mortality Using Death Certificates and Administrative Codes — United States, 1999–2014. *MMWR. Morbidity and Mortality Weekly Report*, *65*(13), 342–345. https://doi.org/10.15585/mmwr.mm6513a2

Ersyaputri, N. (2023). PROGNOSIS PASIEN SEPSIS BERDASARKAN NILAI NEUTROPHIL-LYMPHOCYTE RATIO, MONOCYTE-LYMPHOCYTE RATIO, DAN THROMBOCYTE-LYMPHOCYTE RATIO: Penelitian di ICU RSUD Raden Mattaher Jambi Tahun 2023.

Habiburrahman, M., & Putra, A. B. (2023). Manajemen Komprehensif Sepsis Akibat Infeksi Saluran Kemih pada Kehamilan. Cermin Dunia Kedokteran, 50(6), 311–320.

Hartanto, B., & Zulfariansyah, A. (2020). Laporan Kasus: Tata Laksana Sepsis Bundle pada Pasien Syok Sepsis dengan Perforasi Gaster. In *Majalah Anestesia & Critical Care* (Vol. 38, Issue 1).

Idris, F. (2018). KORELASI KADAR GALECTIN-3 DENGAN BERATNYA DERAJAT KLINIS BERDASARKAN SKOR SOFA PADA PASIEN SEPSIS CORRELATION OF GALECTIN-3 LEVELS WITH CLINICAL SEVERITY ACCORDING TO SOFA SCORE IN SEPSIS PATIENTS. Universitas Hasanuddin.

Irvan, I., Febyan, F., & Suparto, S. (2018). Sepsis dan Tata Laksana Berdasar Guideline Terbaru. *JAI (Jurnal Anestesiologi Indonesia)*, *10*(1), 62. https://doi.org/10.14710/jai.v10i1.20715

Koch, C., Edinger, F., Fischer, T., Brenck, F., Hecker, A., Katzer, C., … Schneck, E. (2020). Comparison of qSOFA score, SOFA score, and SIRS criteria for the prediction of infection and mortality among surgical intermediate and intensive care patients. World Journal of Emergency Surgery, 15, 1–10.

Li, A., Ling, L., Qin, H., Arabi, Y. M., Myatra, S. N., Egi, M., Kim, J. H., Nor, M. B. M., Son, D. N., Fang, W.-F., Wahyuprajitno, B., Hashmi, M., Faruq, M. O., Patjanasoontorn, B., Al Bahrani, M. J., Shrestha, B. R., Shrestha, U., Nafees, K. M. K., Sann, K. K., … Tuân, N. Đ. (2024). Prognostic evaluation of quick sequential organ failure assessment score in ICU patients with sepsis across different income settings. *Critical Care*, *28*(1), 30. https://doi.org/10.1186/s13054-024-04804-7

Liao, K.-M., Lin, T.-C., Li, C.-Y., & Yang, Y.-H. K. (2015). Dementia Increases Severe Sepsis and Mortality in Hospitalized Patients with Chronic Obstructive Pulmonary Disease. *Medicine*, *94*(23), e967. https://doi.org/10.1097/MD.0000000000000967

Purba, A. K. R., Mariana, N., Aliska, G., Wijaya, S. H., Wulandari, R. R., Hadi, U., Hamzah, Nugroho, C. W., van der Schans, J., & Postma, M. J. (2020). The burden and costs of sepsis and reimbursement of its treatment in a developing country: An observational study on focal infections in Indonesia. *International Journal of Infectious Diseases*, *96*, 211–218. https://doi.org/10.1016/j.ijid.2020.04.075

Purwanto, D. S., & Astrawinata, D. A. W. (2018). Mekanisme Kompleks Sepsis dan Syok Septik. *Jurnal Biomedik (JBM)*, *10*(3), 143. https://doi.org/10.35790/jbm.10.3.2018.21979

Putra, I. A. S. (2019). Update Tatalaksana Sepsis. *Cermin Dunia Kedokteran*, *46*(11). https://doi.org/DOI: https://doi.org/10.55175/cdk.v46i11.408

Putra, I. M. P. (2018). Pendekatan Sepsis dengan Skor SOFA. *Cermin Dunia Kedokteran*, *45*(8). https://doi.org/DOI: https://doi.org/10.55175/cdk.v45i8.740

Putra, I. A. S. (2019). Update tatalaksana sepsis. Cermin Dunia Kedokteran, 46(11), 681–685.

Saraswati, D. D., Pudjiadi, A. H., Djer, M. M., Supriyatno, B., Syarif, D. R., & Kurniati, N. (2016). Faktor risiko yang berperan pada mortalitas sepsis. Sari Pediatri, 15(5), 281–288.

Sari, C. E. D. (2023). HUBUNGAN PARAMETER LABORATORIUM DENGAN LAMA RAWAT INAP PADA PASIEN DEMAM BERDARAH DENGUE Studi Observasional Analitik pada pasien rawat inap di RSUD Bayung Lencir Kabupaten Musi Banyuasin. Universitas Islam Sultan Agung Semarang.

Sari, E. K. (2019). Tinjauan Literatur: Perbandingan qSOFA dan SIRS dalam Mengidentifikasi Pasien dengan Sepsis dan Memprediksi Mortalitasnya: Review Artikel. *Majalah Kesehatan*, *6*(4), 277–285. https://doi.org/10.21776/ub.majalahkesehatan.2019.006.04.7

Tiwari, A. K., Jamshed, N., Sahu, A. K., Kumar, A., Aggarwal, P., Bhoi, S., Mathew, R., & Ekka, M. (2023). Performance of qSOFA Score as a Screening Tool for Sepsis in the Emergency Department. *Journal of Emergencies, Trauma, and Shock*, *16*(1), 3–7. https://doi.org/10.4103/jets.jets_99_22

Vivianni, A., & Farhanah, N. (2016). Faktor – Faktor Prediktor Mortalitas Sepsis dan Syok Sepsis di ICU RSUP dr Kariadi. *Jurnal Kedokteran Diponegoro (Diponegoro Medical Journal)*, *5*(4), 504–517. https://doi.org/https://doi.org/10.14710/dmj.v5i4.14246

Wiriansya, E. P., Devi Grania Amalia, Andi Husni Tanra, & Julia. (2022). Manajemen Terapi Cairan pada Sepsis. *Fakumi Medical Journal: Jurnal Mahasiswa Kedokteran*, *2*(6), 393–407. https://doi.org/10.33096/fmj.v2i6.18

Wati, D. K., Hartawan, I. N. B., Suparyatha, I. B. G., Mahalini, D. S., & Pratiwi IGAPE, U. I. (2019). Profil Sepsis Anak di Pediatric Intensive Care Unit Rumah Sakit Umum Pusat Sanglah Denpasar-Bali. Sari Pediatri, 21(3), 152–158.