



EVALUATION OF THE EFFECTIVENESS OF USING RAPID TEST AS A SUPPORT OF THE RESULTS OF THE COVID-19 DIAGNOSIS

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Abstract: COVID-19, a disease caused by SARS-CoV-2, has become a concern of public emergencies around the world. Originating in Wuhan, China has spread globally so rapidly that it can cause millions of deaths worldwide. The purpose and objective of this research is to determine the effectiveness of using the Rapid test in supporting the results of a Covid-19 diagnosis. The study sample described 233 people, with categories OTG, ODP, PDP or Confirm, who were taken from March 2020-June 2020. Although the diagnosis of acute patients with PCR-swabs has become the gold standard in diagnosing Covid-19, it is also necessary to have a Rapid antibody test (blood) in the assessment of cases and antibody responses to specific groups of individuals. In this study, a specific SARS-CoV-2 early detection rapid test (within 15 minutes) was obtained. The results showed a sensitivity of 15.33% and a specificity of 51.19% based on the results of the Rapid test for antibodies (blood) to the Rapid test antigen (swab / PCR), although many negative results were found in the first week after infection. In addition, data analysis was also carried out using the Three-Box Method to understand understanding of the knowledge, actions and actions of respondents in the Covid-19 Pandemic Era. The findings of this research are that knowledge is in good category, attitude is in high category and action is in good category. data analysis was also carried out using the Three-Box Method to understand understanding of the knowledge, actions and actions of respondents in the Covid-19 Pandemic Era. The findings of this research are that knowledge is in good category, attitude is in high category and action is in good category. data analysis was also carried out using the Three-Box Method to understand understanding of the knowledge, actions and actions of respondents in the Covid-19 Pandemic Era. The findings of this research are that knowledge is in good category, attitude is in high category and action is in good category.

Keywords: Covid-19; SARS-CoV-2, Rapid Test, Antibodies, Antigens, IgG-IgM Diagnostics

INTRODUCTION

COronaviruses are a large family of viruses that cause illness ranging from mild to severe. There are at least two types of coronavirus that are known to cause diseases that can cause severe symptoms such as Middle East Respiratory Syndrome (MERS) and Severe

Acute Respiratory Syndrome (SARS). Coronavirus Disease 2019 (COVID-19) is a new type of disease that has never been previously identified in humans. The virus that causes COVID-19 is called Sars-CoV-2. Corona virus is zoonotic (transmitted between animals and humans). Research says that SARS was transmitted from civet cats to humans and MERS from camels to humans. Meanwhile, the animal that is the source of the transmission of COVID-19 is still unknown. (Laboratory testing for coronavirus disease 2019 (COVID-19) in suspected human cases, Interim guidance,

signa and common symptoms of COVID-19 infection include symptoms of acute respiratory distress such as fever, cough and shortness of breath. The average incubation period is 5-6 days with the longest incubation period being 14 days. In severe cases of COVID-19 it can cause pneumonia, acute respiratory syndrome, kidney failure, and even death. The clinical signs and symptoms reported in the majority of cases were fever, with some cases having difficulty breathing, and X-rays showing extensive pneumonia infiltrates in both lungs. (Guidelines for Preparedness for the 2019-nCoV Novel Coronavirus Infection, Directorate General of Disease Prevention and Control, Ministry of Health of the Republic of Indonesia, January 2020).

One of the handling of Covid-19 in Indonesia is currently using Rapid Antibody Tests and or Antigen Rapid Tests, as a support for Covid-19 examinations. Likewise, the Tangerang City area also uses Rapid Test examinations, especially Rapid Antibody Tests, as one of the supporting examinations to help diagnose Covid-19.

According to the World Health Organization (WHO), the COVID-19 rapid test is the initial method of detecting the corona virus in the body. This is done by taking a sample of the patient's blood and seeing the presence of IgM and IgG antibodies. Rapid test results take between 10-15 minutes. After knowing the test results, positive patients must do a swab and self-isolate for 14 days. Likewise, negative patients must also isolate at home for 14 days. This examination must be repeated on negative patients within 7-10 days after the first rapid test. The reason is, the formation of IgG and IgM antibodies takes up to several weeks after the body is exposed to the corona virus. (Laboratory testing for coronavirus disease 2019 (COVID-19) in suspected human cases, Interim guidance, WHO 2 March 2020)

Rapid diagnostic test (RDT) detects the emergence of a person's antibodies against the SARS-CoV-2 virus in the form of IgM antibodies and IgG antibodies. The presence of IgM antibodies indicates the body's response in the early stages (acute response) of Covid-19 virus infection, while IgG indicates the body has been infected with COVID-19. The results can be read visually on an RDT kit, just as they would on a pregnancy test kit. In the current RDT tool used in Indonesia, if the test result is positive, two red bands (on the C and T lines) will appear on the control line, while if only one red band appears (only on the C line) then it will be negative. First Level Service Facilities or more commonly known as Puskesmas are one of the front lines in providing health services, especially during the current pandemic, namely the Covid-19 pandemic. One of the first inpatient health centers in Tangerang City, Banten is the North Larangan Health Center. When the Covid-19 pandemic occurred, the location of the North Prohibition Health Center was included in the "red zone", which means the epidemiological condition was increasing or high with the value of the mapping results getting a value of 60-75. (Decree of the Minister of Home Affairs No. 440-830 of 2020)

The Rapid test examination is the main choice at the North Larangan Health Center as a support for the results of the Covid-19 diagnosis, where this tool is distributed by the Tangerang City Health Office. This rapid test examination is intended for residents around the Puskesmas who are included in the criteria for OTG (People Without Symptoms), ODP (People Under Monitoring) and PDP (Patients With Supervision). Because this examination tool is distributed from the Tangerang City Health Office, the examination is free or there is no charge. This examination is also a dilemma in the community because in several health facilities, especially private health facilities, this Rapid test examination is paid with different prices. Over time there has been an increase in cases not only in the world or in Indonesia, but also in the area around this Puskesmas. So that health facilities as well as the community began to consider conducting a rapid test. In line with this background, the authors are interested in making a Thesis Proposal with the title "Evaluating the Effectiveness of Using Rapid Tests to Support the Covid-19 Diagnosis Results".

1. Can the use of Antibody Rapid Test increase the accuracy of the Covid-19 Diagnosis Results?
2. Can the use of Antibody Rapid Test increase the effectiveness of the Covid-19 Diagnosis Results?
3. Can the use of Rapid Test Antigen/Swab Test (PCR-Polymerase Chain Reaction) increase the accuracy of the Covid-19 Diagnostic Results?
4. Can the use of Rapid Test Antigen/swab test (PCR-Polymerase Chain Reaction) increase the effectiveness of the Covid-19 Diagnostic Results?

LITERATURE REVIEW

Coronavirus Disease

It is an infectious disease caused by a new type of coronavirus. This disease began with the emergence of a pneumonia case of unknown etiology in Wuhan, China at the end of December 2019. The Chinese government later announced that the cause of the case was a new type of coronavirus which was later named SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2). This virus belongs to the same family as the viruses that cause SARS and MERS. Even though they come from the same family, SARS-CoV-2 is more contagious than SARS-CoV and MERS-CoV (CDC China, 2020). The rapid transmission process led WHO to designate COVID-19 as KKMMMD/PHEIC on January 30, 2020. The crude mortality rate varies by country and depends on the population affected, the development of the outbreak in a country,

Administration of Antibody Rapid Test and Antigen Rapid Test

Rapid testis an initial screening method to detect antibodies, namely IgM and IgG, which are produced by the body to fight the Corona virus. These antibodies will be formed by the body when there is exposure to the Corona virus. In other words, if these antibodies are detected in a person's body, it means that the person's body has been exposed to or entered by the Corona virus. Rapid test examination is one of the options for supporting examinations because its use does not require sophisticated laboratory facilities and the results can be obtained quickly. But you need to know, the formation of these antibodies takes time, it can even take several weeks. (Laboratory testing for coronavirus disease 2019 (COVID-19) in suspected human cases, Interim guidance, WHO 2 March 2020). Rapid Test Antibodies The specimen required for this examination is blood. This check can be done in the community (society). Rapid Antigen Test with Specimens needed for this examination are oropharyngeal

swabs/nasopharyngeal swabs. This inspection is carried out in health facilities that have biosafety cabinet facilities.

KSurveillance and Quarantine activities

Surveillance efforts are ongoing monitoring of at-risk groups. While quarantine is a restriction on a person or group of people in an area including areas suspected of being infected with a disease and/or contaminated to prevent the possibility of spreading disease or contamination.

Early Detection and Response in the Region

Each ODP, PDP and confirmed case must be subjected to an epidemiological investigation using the form. Epidemiological investigation activities are carried out mainly to find close contacts/OTG using forms. The results of epidemiological investigations can provide input for policy makers in the context of controlling or terminating transmission more quickly. In addition to epidemiological investigations, other prevention activities include patient management, prevention, extermination of the causes of disease, handling of corpses, risk communication, and others.

Management of Antibody Rapid Test and Antigen Rapid Test

PCOVID-19 treatment in Indonesia uses Antibody Rapid Test and/or Antigen Rapid Test on OTG/contact cases from confirmed COVID-19 patients. Rapid Test Antibodies / Rapid Test Antigens can also be used to detect cases of ODP and PDP in areas that do not have facilities for RT-PCR examination or do not have specimen collection media (Swab and VTM). The Antibody Rapid Test and/or Antigen Rapid Test is only an initial screening, the results of the Antibody Rapid Test and/or Antigen Rapid Test must still be confirmed using RT-PCR.

RESEARCH METHODS

This research method includes Research Evaluation research; the process of determining whether the learning materials and methods are in accordance with the expected goals (Viviane and Gilbert de Lansheere, 1984). Evaluation is defined as an assessment process (Curtis, Dan B; Floyd, James J.; Winsor, Jerryl L, 1996). Based on some of the descriptions above, it can be concluded that evaluation research is a systematic scientific procedure carried out to measure the results of a program or project (the effectiveness of a program) in accordance with the planned objectives or not, by collecting, analyzing and reviewing program implementations carried out systematically. objective. Then formulate and determine policies by first considering the positive values and benefits of a program. This study uses observational data on the use of rapid tests as well as on the results of the Covid-19 diagnosis, the data is then analyzed to test the effectiveness of using the rapid test tool. The function and purpose of the evaluation in this research is Formative Evaluation which functions as data collection while education is still in progress. The data from this evaluation can be used to "form" and modify the program of activities. If in the middle of the activity it is known what things are negative and decision makers can determine attitudes about the ongoing activities (Michael Scriven, 1970). In the second stage, in order to strengthen the results of the research in the first stage. Next, a sensitivity and specificity analysis will be carried out. The data is then analyzed to test the effectiveness of using the rapid test tool. The function and purpose of the evaluation in this research is Formative Evaluation which functions as data collection while education is still in progress.

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Population and Sample

The population taken was all patients, both OTG, ODP, PDP, negative, positive and confirmed who underwent antibody and antigen rapid tests at the North Larangan Health Center, as many as 233 people.

Non-probability sampling uses purposive sampling, which is one of the non-random sampling techniques, where the researcher determines the sampling by setting special characteristics that are in accordance with the research objectives so that it is expected to be able to answer research problems. The technique of taking samples is not based on random, regions or strata, but based on considerations that focus on certain goals.

Data analysis

One of the criteria in a screening test is accuracy and reliability. Accurately shows the extent to which the results of screening/screening correspond to reality. Meanwhile, reliability relates to standardization of test equipment or confirmation tests. In other words, reliability shows the consistency of the measurement tool, if the measurements are carried out repeatedly, the results obtained are not much different.

In confirmation tests, Thornier and Remain (1961) discovered a method called Thorner-Remain Screening Test. This method is a diagnostic confirmation tool in the form of a 2 x 2 tab that produces sensitivity, specificity, predictive value and prevalence values.

FINDINGS AND DISCUSSION

If people who are sick according to the screening and really sick according to the standard diagnosis, then the sensitivity test (= Se) is used, namely

$$\text{Se} = (a/a+c) \times 100\%$$

$$(23/(23+127)) \times 100\% = 15.33\%$$

Based on the results of the Sensitivity test, the percentage of Rapid Test Antibodies (blood) to Rapid Test Antigen has a sensitivity of 15.33%. This means that the Rapid antibody test (blood) can state that someone who is really sick has a percentage value of 15.33%.

If people who are healthy according to the screening and really healthy according to the standard diagnosis, then the Specificity test (= Sp) is used, namely

$$\text{Sp} = (d/b+d) \times 100\%$$

$$(43/(40 + 43)) \times 100\% = 51.19\%$$

Based on the results of the Specificity test, the percentage of Rapid Test Antibodies (blood) to the Rapid Test Antigen has a specificity of 51.19%. This means that the Rapid antibody test (blood) can state that someone who is really healthy has a percentage value of 51.19%.

Furthermore, we can also calculate the percentage of false positives (FP) and false negatives (FN), namely

$$\text{FP} = b/(b+d) = 1 - \text{Sp}$$

$$= 40/(40+43) = 1-0.48 = 0.52 \text{ or } 52\%$$

$$\text{FN} = c/(a+c) = 1 - \text{Se}$$

$$= 127/(23+127) = 1-0.84 = 0.16 \text{ or } 16\%$$

Based on the calculation of the False Positive and False Negative presentations, the results of the Antibody Rapid test (blood) against the Antigen Rapid test have a percentage of

False Positive (false positive) values of 52%. In this case the Rapid antibody test (blood) will declare a person with a positive result but is actually not diseased with a value of 52%. As for the results, the percentage value of False Negative (false negative) is 16%. In this case the Rapid antibody test (blood) will declare a person with a negative result but is actually diseased with a value of 16%.

The use of the Antibody Rapid test (blood) is effective against the results of the Covid-19 diagnosis.

This study states that the use of the Antibody Rapid test is effective against the results of the Covid-19 diagnosis. The effectiveness of the Antibody Rapid test (blood) is assessed from the speed of the Antibody Rapid test in helping to diagnose Covid-19. Based on the table presenting the values of False Positive and False Negative, the results obtained were False Positive (False Positive) on the use of Antibody Rapid test (blood) was 52%. Rapid antibody test (blood) will declare a person with a positive result but actually not diseased with a value of 52%. In this case, if the Rapid antibody test (blood) is used in an emergency, it is effective in sorting or diagnosing 52% (>50%) patients with the intention of being one of the ways to prevent the transmission of Covid-19. this is supported by research journals: Journal Evaluation of a COVID-19 IgM and IgG rapid test; an efficient tool for assessment of past exposure to SARS-CoV-2. Infection Ecology & Epidemiology (Taylor and Francis, 2020). In this research journal, it states that Covid-19 is a pandemic that has occurred recently. In a study evaluating the effectiveness of the Rapid test which took only 15 minutes. A serological test is needed to investigate the antibody response and immune potential in the body. In this journal, a rapid antibody test has been carried out on people who have actually been identified as Covid-19 with positive PCR results. first after infection

The use of the Rapid Antibody (blood) test is accurate for the results of the Covid-19 diagnosis

This study states that the use of the Antibody Rapid test (blood) is not accurate for the results of the Covid-19 diagnosis. Based on the table presenting the values of False Positive and False Negative, the results obtained were False Negative (False Negative) on the use of Antibody Rapid test (blood) was 16%. Based on this explanation, it can be concluded that the use of the Antibody Rapid test is not accurate for the results of the Covid-19 diagnosis because the Rapid antibody test (blood) will declare a person with a negative result but is actually diseased with only a value of 16%. this is supported by the research journal: Journal of Viral Kinetics and Antibody Responses in Patients with COVID-19 Department of Infectious Diseases (China March 26,

The use of Rapid Antigen Test (swab/PCR) is effective against the results of the Covid-19 diagnosis.

This study states that the use of Rapid Antigen Test (swab/PCR) is effective against the results of the Covid-19 diagnosis. Based on the table of specificity test results, the value of Sp. on the use of Rapid Test Antibodies (blood) against Rapid Test Antigen (swab/PCR) is 51.19%. In this study, the use of the Rapid Antigen Test (swab/PCR) was effective in diagnosing Covid-19, seen from the ability to detect someone exposed to Covid-19 from the first week of exposure. This is supported by a research journal: Journal of Medical Virology: Stability issues of RT-PCR testing of SARS-CoV-2 for hospitalized patients clinically diagnosed with COVID-19. Chunhua Yang, MD, Department of Intensive Care Unit, The Sixth Affiliated Hospital Sun Yat-Sen University, 510655 Guangzhou (China March 22, 2020). In this research journal, there were 610 patients who were tested from February 2,

2020 to February 17, 2020 at Hankou Hospital in Wuhan, where this hospital is specifically for Covid-19 patients. Some patients who had positive results had negative results after treatment. And there are also patients who no longer have symptoms when the RT-PCR is checked again, the results are positive. In this research journal, it is stated that RT-PCR can be effective in detecting the Covid-19 virus from the first day of infection. A person in Covid-19 treatment who no longer has symptoms does not necessarily have a negative RT-CR result, so RT-PCR is an examination tool that can be used to diagnose Covid-19. where this hospital is specifically for Covid-19 patients. Some patients who had positive results had negative results after treatment. And there are also patients who no longer have symptoms when the RT-PCR is checked again, the results are positive. In this research journal, it is stated that RT-PCR can be effective in detecting the Covid-19 virus from the first day of infection. A person in Covid-19 treatment who no longer has symptoms does not necessarily have a negative RT-CR result, so RT-PCR is an examination tool that can be used to diagnose Covid-19. where this hospital is specifically for Covid-19 patients.

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The use of the Rapid Antigen Test (swab/PCR) is accurate for the results of the Covid-19 diagnosis.

This study states that the use of the Rapid Antigen test (swab/PCR) is accurate for the results of the Covid-19 diagnosis. Based on the processing of the data presented in the Sensitivity and Specificity table, it is known that the Rapid Antigen Test (swab/PCR) as the gold standard in examining the results of the Covid-19 diagnosis can provide high accuracy. this is supported by a research journal: Journal International of Infection Evaluation of Novel Antigen-based Rapid Detection Test for The Diagnosis of SARS-CoV-2 in Respiratory Samples. The British Infection Association by Elsevier Ltd (May 16, 2020). In this research journal, 127 samples were used with 82 samples positive for RT-PCR. In this study there were 53.5% men, with an average age of 38 years. Most stated positive on day 0-7 days.

CONCLUSION AND SUGGESTIONS

Conclusion

1. Antibody (blood) rapid test is effective in diagnosing Covid-19. This is judged by the speed of the Antibody Rapid test in helping group people suspected of Covid-19, so that only in an emergency this tool can be used.

2. Antibody (blood) rapid test is not accurate in diagnosing Covid-19. This is assessed because the Rapid antibody test (blood) can state a person with a negative test result, but is actually sick.
3. Antigen rapid test (swab/PCR) examination has effectiveness and accuracy in diagnosing Covid-19. This is because a positive result (confirm) in a swab examination is a way of true diagnosis of Covid-19 and is the gold standard in determining Covid-19 since the first week of examination.
4. Examination of Rapid test Antibodies (blood) have various types of tools. The selection of an examination tool using the Antibody Rapid test should use the IgG and IgM Antibody Rapid test to help diagnose suspected Covid-19.
5. The variables in this study have a high value of knowledge, attitudes and actions or are considered very good in understanding Covid-19 starting from the causes, symptoms and even prevention of transmission, namely with the health protocols recommended by WHO.

Suggestions

1. For the management of the North Larangan Health Center, it is hoped that they will continue to strive for rapid antibody (blood) and rapid antigen (swab/PCR) examination activities to be carried out at the North Larangan Health Center on a regular basis and by adding the number of examinations and examination targets supported by the availability of available tools. increase. In addition, it can provide suggestions to the Tangerang City Health Office so that the laboratory examinations at the North Larangan Health Center can increase the quantity in their examinations.
2. For the officers at the North Larangan Health Center, it is hoped that in working during the Covid-19 pandemic, they will continue to pay attention to health protocols as a way to break the chain of transmission of Covid-19 and remain alert to the condition of any patient, both symptomatic and asymptomatic. Continue to carry out maximum screening for each patient and make the Rapid Antigen (swab) examination the first choice. The conclusions obtained still have weaknesses and need more in-depth study.
3. In an effort to improve the results of the study, the authors suggest to further researchers, namely:
 - a. Expanding and developing the theory of using Rapid antibody (blood) and Rapid antigen (swab/PCR) tests in the Covid-19 pandemic era so that conclusions and parameters obtained can have a sharper level of generalization.
 - b. It is necessary to expand the object of research in the future so that the determination of parameters is general, for example researching in relation to the calculation of complete blood laboratory examinations and the results of lung X-rays.
 - c. Expanding the study of other examinations in an effort to develop theory.

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