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Misinterpretation of the CT Value Assessment in the Covid 19 Test Examination with the PCR SWAB Means of Healing

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A B S T R A C T

This study aims to determine CT Value Knowledge in the Covid 19 Test examination with the PCR SWAB method as a measure of healing, this examination method has been carried out following government policy at the beginning of the emergence of the Covid 19 virus which was announced in Indonesia. This study used qualitative methods of observation and documentation as well as sources of secondary data which were conducted through social media including interviews with experts and community sources on YouTube digital media, journals and websites for PCR examination laboratories and hospitals. The results of this study indicate that assessing the value of CT according to government policies is universal because it originates from policies established throughout the country.

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INTRODUCTION

Novel coronavirus severe acute respiratory syndrome coronavirus 2 (SARS-CoV2), which originally appeared in December 2019 in Wuhan, China, quickly spread to many countries, resulting in a pandemic of the new coronavirus disease 2019 (COVID-19). This pandemic caused human health problems and the decline of the world economy. Although the novel coronavirus (SARS-CoV-2) can cause severe viral pneumonia and acute respiratory distress syndrome (ARDS), it shows a high mortality rate of 12-45% among patients. In Indonesia, this case was first discovered in two Depok residents. , West Java in early March 2020. Positive cases of Covid-19 in Indonesia as of May 31 2020 added 700 people. So that the total positive cases to date have reached 26,473 people. Meanwhile, the number of recoveries, from the data recorded today, reached 7,308 people or an increase of 239 people. The number of cases of death increased by 40 people. So that the total becomes 1,613 people. According to a government spokesperson for handling Covid-19, the spread of this virus in Indonesia was very fast, this was because people did not heed government orders to remain silent at home and many people were still carrying out activities outside their homes which resulted in crowds of people. The corona virus is a dangerous epidemic. Even though these symptoms would only be mistaken for the common cold, for medical analysis this virus is quite deadly. This corona virus has many negative impacts on the people of Indonesia. People must be vigilant about going out of their homes to make a living and even the government has also suggested staying indoors if not to carry out something truly emergency.

The coronavirus disease 2019 (COVID-19) pandemic has caused concern globally. The World Health Organization (WHO) has declared it a global health emergency on 30 January 2020. The Minister of Health of the Republic of Indonesia has issued Decree of the Minister of Health Number HK.01.07/MENKES/104/2020 concerning Determination of Novel Coronavirus Infection (2019-nCoV Infection) as a Type of Disease What Can Cause Outbreaks and Efforts to Overcome It. The determination was based on the consideration that the Novel Coronavirus Infection (2019-nCoV Infection) had been declared by WHO as a Public Health Emergency of Concern for the World (KKMMD) / Public Health Emergency of International Concern (PHEIC) due to a significant increase in cases and confirmation cases in several other countries .

Examination using the NAAT method refers to the Decree of the Minister of Health Number HK.01.07/MENKES/3602/2021 concerning Amendments to the Decree of the Minister of Health Number HK.01.07/MENKES/446/2021 concerning the Use of Antigen Rapid Diagnostic Tests in Testing for Corona Virus Disease 2019 (COVID19) . This swab test method is the most appropriate procedure according to world medical standards and is a recommendation from WHO. Global health is a health area that focuses on world health issues (Mahendradhata: 2020). Global health events generally involve cooperation across countries, are multidisciplinary in nature, and aim to achieve equality in the health status of the world's population. Meanwhile, global health policy includes the world government's

health efforts to form health policies that are fundamental to the world community.

Public knowledge to determine the ct value is the number that is reported together with the results of the RT-PCR corona test. Currently, the CT value is often used as a benchmark for society in drawing conclusions about the condition of COVID-19 in a sufferer's body. However, this figure should not be interpreted on its own, because it has the potential to cause misinterpretation and lead to 'blunders.

METHODOLOGY

The research method used is a qualitative method of observation and documentation and is sourced from secondary data which is carried out through social media including PCR examination laboratory websites, hospitals and some information from various expert opinions in interviews conducted quotes from news information sources, youtube, and other social media. As for the information that can be used as a reference for comparison of information on CT value knowledge from various sources, the most commonly found is from hospital websites, laboratories as well as digital platforms that disseminate the information provided and complement it with information from trusted news sources and various mass media, namely coil.com , hospital sites, digital health platforms, updated information from the Ministry of Health's website. This research was conducted during the Covid pandemic in 2020 - 2021 so that there were many differences in perceptions of knowledge about the assessment of the PCR swab examination, namely the CT value on these results. The main informants were professionals from various sources, namely specialist doctors who handled Covid cases, specialist doctors in clinical pathology and pulmonary specialist.

RESULTS

The definition of CT VALUE is the CT (cycle threshold) value, which is the value that appears at the point where the reaction reaches a fluorescence intensity that exceeds a predetermined size limit. The CT value indicates when the target nucleic acid is detected in the amplification process (copy amplification of genetic material).

CT value is the value that appears in the PCR test. CT stands for cycle threshold which is one amplification cycle in a PCR test. PCR tests with reverse transcription (RT) are also often called real time/RT-PCR—itself has become the gold standard for detecting the SARS-CoV-2 corona virus that causes Covid-19. In the RT-PCR test, ribonucleic acid (RNA) is extracted from patient samples taken by swab (swab). PCR examination is useful for detecting the presence of genetic material in the form of viruses, bacteria, certain cells, and whether the corona virus is present or not in your body. In the process, the machine used will perform repeated checks and amplifications to determine whether the sample taken from you contains genetic material in the form of a corona virus or not. The amplification cycle unit in the PCR test examination is called the CT value, which is a threshold value for an examination cycle. In general, the repetition or amplification process to detect the presence of the corona virus in

PCR examination is carried out 40 times or a CT value of 40.

For PCR examinations in the Laboratory, there are provisions for optimal results, namely the results can come out within the fastest range of 1 day, there are also those that require a little longer. This duration depends on the availability of laboratories or health facilities that can be visited. With a slightly more intensive time than the Rapid Test, to get results of up to 95% accuracy. This can treat infected patients more quickly with the certainty of relatively fast Swab test results, whether they need to be self-quarantined or receive intensive care at the hospital. Even though the price is higher than the Rapid Test, this PCR Swab swab test method is the most recommended by WHO and the Ministry of Health.

DISCUSSION

Global Health Policy Global health is an area of health that focuses on world health issues (Mahendradhata: 2020). General global health events includes cross-country cooperation, is multidisciplinary in nature, and aims to achieve equality in the health status of the world community. Meanwhile, global health policy includes the world government's health efforts to form health policies that are fundamental to the world community. Global health policy has a distinctive principle, namely it pays attention to the health needs of people living on planet earth, instead of paying attention to a particular country. The implementation of global health policies involves actors across countries, ranging from domestic governments to civil society. Some experts say, 'quarantine', as happened during the period of the Covid-19 pandemic, is the first form of global health policy. In this case, the Covid-19 case has a global health policy for the CT value assessment of the PCR SWAB examination.

The information in this study was obtained from news sources and the opinions of specialist doctors from different backgrounds, as well as public opinion. The following is a summary table of opinion information regarding the knowledge of the CT value assessment of the PCR SWAB examination as a measure of healing.

Informan	Media Source	Employment
1.	Website Kampus UI	Dokter spesialis mikrobiologi
2	Website Berita Kompas	Dokter Spesialis patologi Klinik 1
3	Website Rumah sakit	Dokter spesialis paru
4	Youtube CNN	Dokter spesiali Patologi Klinik 2
5	Youtube Gue Sehat	Dokter Spesialis penyakit dalam
6	Jurnal	Peneliti
7	DOK. Metro TV	Dokter Spesialis Patologi Klinik RS UNS Surakarta
8	Channel Metro TV	Masyarakat
9	Website kompas.com	Masyarakat
10	CNBC Indonesia	Masyarakat

a. Microbiologist's opinion:

The condition of a COVID-19 patient cannot only be seen from the CT value, high or low CT values cannot fully determine whether the patient is still infectious or not. In general, if we find a lot of genetic material, we can find a smaller CT value, maybe dozens. If there is little [genetic material], the CT value is high. This is a bit tricky, because we don't know when he did the inspection which phase he was in, early or late, unless there was info. the CT value shows the number of cycles to which the genetic material is (in this case, the coronavirus) was successfully detected by the detection engine.

If the amount of genetic material or virus is large, it can be detected in the early cycle. So, the CT value is low. Meanwhile, if the amount is less, the genetic material will be detected in further cycles, so that the CT value is high. The CT value is not related to the severity of COVID-19 symptoms. There are those with mild symptoms but a low CT value, there are those with severe symptoms with a high CT value. If there is an error in the examination or the results are invalid, the laboratory will immediately request a re-sampling. Cycle Threshold (CT) Value is the value that comes out of the results of the Polymerase Chain Reaction (PCR) swab test which is able to show the number of temperature cycles and is able to detect genetic material through signals that enter the machine. dr. Ardiana said that there are no categories in the CT Value in the form of numbers that determine the good or bad of a person's condition, because the results that come out are in the form of positive or negative conditions. PCR examination only describes the condition of the sample that has been taken and does not show the total amount of virus present in the patient's body, samples taken by PCR examination of the upper, lower respiratory tract, or even in the digestive tract will differ from the amount of virus. PCR examination is whether the virus contained in the patient's body is at an early or late stage, this information is very important to prevent the risk of transmission of Covid-19. CT Value does not determine the recovery of Covid-19 patients by carrying out PCR tests which are more effective than antigens. because PCR has become the closest choice to accuracy with a fairly good sensitivity value. The advantage of this PCR examination is that the viral genetic material in the sample is only small, but can still be detected. Patients who are positive for Covid-19 without any symptoms can be detected through PCR examination.

b. Opinion of a clinical pathologist 1 & 2

Clinical pathology doctor 1: The CT number is an indicator used by doctors to find out the condition of a Covid-19 patient. CT value shows the estimated amount of virus in the sample. If the method of taking the sample is correct, it means that it also describes the amount of virus at the place where the swab was carried out. The CT value is low, the virus count is high, but the symptoms are mild. On the other hand, there are those with a relatively high CT value, the amount of virus is suspected to be low, but the symptoms are actually more severe, the CT number listed on the PCR test results cannot be read as a single parameter to determine the patient's overall condition. Tonang said that this CT value information would only be used by the treating doctor as additional information to make decisions regarding the patient's condition and what kind of

treatment should be given next. the ability of PCR tests to find live or dead viruses (fragments/carcasses).Clinical pathology doctor 2: note that if the respiratory sample from the CDC cannot be used as a benchmark for the severity of the disease, still monitor clinical symptoms from vital signs from a supporting laboratory.

5 Categories of Covid symptoms according to the Indonesian Ministry of Health, namely: 1. Asymptomatic 2. Mild 3. Moderate 4. Severe. 5. Critical regardless of the ct value, the doctor's assessment is based on clinical symptoms, for example if a person has a ct value of 17 but the symptoms are in the mild category, only flu syndrome symptoms can still be isoman, symptomatic therapy for flu, vitamins and nutrition is good if the ct value is 27 but uses a ventilator, regardless of the interpretation or the ct value lab will issue positive or negative results.

c. Opinion of a pulmonologist

CT Value stands for Cycle Threshold Value. The number shown is the number of rounds on the machine (according to the number), the Sars Cov-2 virus was detected on the PCR Swab examination. The higher the CT number, the more the virus is detected. CT values are needed by doctors to decide on a diagnosis and further steps for treatment or treatment. CT value<29: Strong positive, CT value 30-37: Positive, CT value 38-40: Weak positive. The average NEGATIVE PCR result uses a standard of 35-40, depending on the tool used when performing RT-PCR. Healed is when the patient goes from being symptomatic, then becomes asymptomatic again for 3 days. Healing is from people who can't move, then they can move again. The PCR Swab Test cannot distinguish viruses that are still alive/active and viruses that are dead/inactive (already dead).

As long as there is still Corona virus genetic material in the body, the PCR results will remain positive. The process of destroying the remains of the dead virus by the body takes up to 83 days, so it is still possible to be detected by PCR for the next 3 months. The use of CT Value for medical purposes is for a doctor's diagnostic purposes and to assess the course of improving a patient's immunity while fighting the virus. Criteria for recovering for positive COVID-19 patients that apply in Indonesia: Patients without symptoms: Have passed the isolation period for 10 days. Patients with mild to moderate symptoms: Have passed a period of isolation for a minimum of 10 days, plus 3 days without symptoms. Patients with severe symptoms: Has passed the isolation period for at least 10 days, plus 3 days without symptoms and 1 negative result on PCR test.

d. Opinion of a doctor who specializes in internal medicine

CT value does not indicate the degree of the number of diseases, CT value does not indicate whether the person is highly infectious or not, CT value is a useful indicator but must be correlated with the patient's condition CT value between different laboratories cannot be compared because of different machines and reagents so to further assessment should be carried out by physical examination, laboratory, and X-ray examination of the lungs

e. Research journal of the Faculty of Medicine, University of Lampung

Research on the value of CT on the clinical severity of COVID-19 patients could not show any correlation. Although patients with mild disease had lower CT values and possibly a higher viral load, they were also tested earlier (3 days) than patients with severe disease (5 days). However in patients with severe disease, the CT scores of those who died were significantly lower than those who survived; but at the same time these patients had a shorter duration of symptoms before testing (3 days compared to 5 days). 21 Similarly, another study found no difference in viral loads as determined by CT scores between symptomatic and asymptomatic patients.

f. Specialist Doctor of Clinical Pathology at UNS Surakarta Hospital

The assessment shows that the higher the CT value means that the higher the amount of DNA in the sample, the lower the number of cycles needed to get good results and vice versa if the result is low, the CT value is higher or the CT value contains a little virus. The CT value only measures the virus content in the sample, not the total virus content in the human body, the CT value alone cannot be used as a benchmark for the severity and risk of transmission.

g. According to @evanbagus3090

CT values can also help epidemiologists track outbreaks. If there are many low CT values, it can be concluded that the outbreak is widespread. But if most of the CT values are high, the probability of an outbreak has been reduced. In addition, CT values can help doctors identify patients who are most at risk of severe disease and death, especially those with co-morbidities. However, a high viral load does not always cause disease. In one case, about 40% of people who contracted the coronavirus remained healthy even though they had the same amount of virus as the patients who fell ill. the current problem is that many companies still rely on the CT Value for evaluation or recovery of their employees who have been exposed to covid. even though the symptoms are mild or even otg still ct value. case example at my workplace safe house for 10 days. and my condition is very fit. but when the PCR CT was 33 and the hospital cut off was handling 35. in the end I still tested positive and had to add isolation for 7 days.

h. According to Andrean Kristianto at the GSI Lab (Indonesia Solidarity Genomics Laboratory), in CNBC Indonesia,

One of the things that often becomes the subject of discussion during the Covid-19 pandemic is related to the CT value or cycle threshold value. Some say if you are above 30 then you are cured of Covid-19. On social media, there was an appeal to ask for the results of the CT value during the PCR test. It was stated that if the CT value shows above 30 then the patient has recovered from Covid-19.

Unfortunately the CT Value cannot be used as a reference for the recovery of someone affected by Covid-19. This was also revealed by medical

practitioners, Dr. Andi Khomeini on an occasion some time ago. And the factor of a person recovering must be seen as a whole. "We cannot use CT as a guideline for recovery. Looking at the data as a whole, we can only say continue treatment or continue with activities. Apart from that, we also look at the results of a thorough examination of the patient. The determining parameters can also be seen from the X-ray results and the patient's blood profile.

CONCLUSIONS

Knowledge of viral load is very important for formulating strategies for antiviral treatment, vaccination and epidemiological control of COVID-19. In addition, identification of patients with high viral load is also useful for understanding risk factors such as age, comorbidities, symptom severity and hypoxia, to decide whether to hospitalize. Several ongoing studies analyze viral load in different types of samples and evaluate its relationship to clinical outcome and viral transmission pathways. However, in a large number of new studies, the cycle threshold value (Ct) alone is often used as an indicator of viral load, which may be an error.

Experts claim that CT values for specimens vary between different kits and techniques (including target genes, primers, and fluorescence threshold values) and CT values can vary between different sets of the same kit. CT values also depend on the method of sample collection and hence there may be variations in CT values between two different samples obtained from the same person on the same day and run on the same kit. CT values also depend on the time of sampling in relation to the onset of symptoms; samples collected earlier in illness will have lower CT values than samples collected later in illness. The technical competence of the person performing the test, calibrating the equipment and analytical skills interpreting the results can be biased which can affect the value of Ct. For this reason, CT values cannot be used to determine the severity of patients with confirmed COVID19. The use of CT values in determining several clinical parameters in COVID-19 patients cannot be used with certainty, because there are many factors that affect CT values such as sampling time, sampling method, tools used, and the skills of these health workers which can be biased. affect the value of CT. It is necessary to conduct further research on the correlation of CT values in COVID-19 patients.

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