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Titer Differences in Rheumatoid Factor Level in The Elderly Using The Glycine Saline Buffer Reagent and 0.9% NaCl Ready to Use

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ABSTRACT

Introduction: The incidence of Rheumatoid Arthritis (RA) in Indonesia has a case prevalence ranging from 0.1% to 0.3%. Limitations in the supply of Glyceline saline buffer in laboratory examinations, especially in the laboratory for examination of Rheumatoid Factor (RF), is one of the reasons for the need for alternative materials with the same effectiveness to be used in examinations. An alternative in carrying out inspections if commercial reagents are not available so that ready-to-use 0.9% NaCl reagent can be an alternative reagent. The purpose of this study was to determine whether there were differences in the titers of rheumatoid factor levels using glycine saline buffer reagents and ready-touse 0.9% NaCl. Method: The study was conducted at the IKesT MP Clinical Pathology Laboratory. The research design used a posttest only control group design. The population is 43 elderly people at the Harapan Kita Nursing Home. a sample of 30 elderly people with purposive sampling technique. Data were analyzed by Wilcoxon test. Results: The results obtained were p = 0.000 for titer examination of RF levels using Glycine Saline Buffer reagent and ready-to-use 0.9% NaCl reagent. Discussion: There are differences in the titers of rheumatoid factor levels using glycerin saline buffer and ready-to-use NaCl. 0,9%.

Keywords: Rheumatoid Factor, Glycine Saline Buffer Reagent, NaCl 0,9%.

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INTRODUCTION

The incidence of Rheumatoid Arthritis (RA) in Indonesia prevalence ranges from 0.1% to 0.3%. In children and adolescent the prevalence is one in 100,000 people. It is estimated that the number of sufferers of rheumatoid arthritis in Indonesia reaches more than 360,000 people (Damanik et al., n.d.).

According to the World Health Organization (2016) states that the incidence of rheumatoid arthritis reaches 20% of the world's population, 5-7% are those aged 55 years. According to the Ministry of Health of the Republic of Indonesia, in 2019 rheumatoid arthritis sufferers have experienced an increase in the last 3 years, namely 91.098 in 2017, 96.679 in 2018, 102.995 and in 2019 they are in 3rd position out of the 10 most common diseases in Indonesia (Utama et al., 2022) and (D. Andri, 2020).

Rheumatoid Arthritis is an autoimmune rheumatic disease characterized by progressive joint destruction, functional limitations and systemic manifestations. Some patients with rheumatoid arthritis have more progressive manifestations so that they have a poor (functional and life expectancy) prognosis. In addition, this disease causes inflammation, stiffness, swelling, and pain in the joints, muscles, tendons, ligaments and bones (Soryatmodjo & Ningsih, 2021).

According to SIRS Online data from the Directorate General of Health Services in 2017, data on the proportion of male patients was 54.3% and female patients were 45.7%. Based on these data it can be concluded that currently autoimmune diseases can attack women in the productive age of 15-50 years and with the category of elderly aged 50 years.

Elderly is an age that is more likely to experience autoimmune, this is based on the statement that the older you get or the older you are, the more likely you are to experience autoimmunity compared to a younger age. As they get older, the elderly experience a decrease in body function and balance, as well as the emergence of several disorders, one of which is autoimmune (Meri & Wulan, 2019).

Autoimmune is an immune response or immune system that is formed as a mistake to identify foreign objects. Cells, tissues or organs of the human body will be considered as foreign objects so that they are destroyed through the intermediary of antibodies. Autoimmune diseases do not have the effect of increasing the body's resistance against a disease, but can cause damage to the body due to the immunity that is formed (Meri & Wulan, 2019).

This autoimmune disease is characterized by chronic inflammation of the joints of the hands and feet accompanied by symptoms of anemia, fatigue and depression. This inflammation causes loss of joint function due to bone damage which leads to

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progressive disability (Setiawan et al., 2019). An autoimmune disease that often occurs in the elderly is rheumatoid arthritis (J. Andri et al., 2020).

The role of autoantibodies in the pathogenesis of rheumatoid arthritis is still debated but a common finding in rheumatoid arthritis is the presence of IgM antibodies that react with the Fc IgG moiety, causing the formation of immune complexes. These anti-IgG antibodies are called Rheumatoid Factor (RF) (Mukrimaa et al., 2021).

Rheumatoid factor is an antibody to the Fc region of Immunoglobulin G. However, most rheumatoid factor is IgM. rheumatoid factor is found in a small percentage of healthy subjects and up to 20% in subjects over 65 years of age (Elsi, 2018). In making a diagnosis of rheumatoid factor disease, appropriate laboratory tests will be carried out (Kodariah et al., 2022).

Examination of rheumatoid factor is a screening test used to detect antibodies (IgM, IgG IgA or IgE) found in the serum of people suffering from rheumatoid arthritis. Examination of rheumatoid factor can be done by capillary precipitation method, radioimmunoassay, nephelometry and agglutination test. The principle of examining rheumatoid factor is a reaction based on an immunological reaction that binds to IgG Latex in the patient's serum and agglutination will form if the serum contains RF (Simbolon, 2021) and (Diarti et al., 2016).

The method used to examine rheumatoid factor is the latex agglutination method, this method is to look at the results of the rheumatoid arthritis test in the elderly, which has the principle of examining an agglutination reaction between cell antigens, microorganisms or particles that appear on specific antibodies. Agglutination reactions are compared by antigenantibody interactions. Positive results (+) will then be followed by a semiquantitative test by reading the agglutination titers formed (Diarti et al., 2016).

Examination of the RF level titer dilutes the sample with the gliyceline saline solution reagent which is a complex which catalyzes the cleavage of glycine into CO2 which can be reversed, has a pH of 7.5 and ionic strength of 0.25, economically the price of this reagent is quite expensive and has the weakness of being unstable and easily contaminated and an alternative reagent is needed, namely ready-to-use 0.9% NaCl solution (Andrea, 2020).

Limitations in the supply of glyceline saline buffer in laboratory examinations, especially in RF examination laboratories, is one of the reasons for the need for alternative materials with the same effectiveness for use in examinations. This is supported by Regulation of the Minister of Health of the Republic of Indonesia number 43 of 2013, where artificial reagents are needed as an alternative in carrying out inspections if commercial reagents are not available so that ready-to-use 0.9% NaCl reagent can

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be an alternative reagent (Permenkes, 2013).

Ready-to-use 0.9% NaCl which is an isotonic solution obtained by 0.9 grams of NaCl crystals dissolved in 100 ml of distilled water. 0.9% NaCl has isotonic properties that are able to maintain pH changes, 0.9% NaCl solution has properties similar to buffer and does not affect the examination results, the advantages contained in ready-to-use 0.9% NaCl are that this reagent is called an environmentally friendly reagent, easy to obtain and this reagent does not need to go through a manufacturing process because this reagent is ready to use (Diarti et al., 2016).

MATERIALS AND METHODS

This study uses a true experimental design. The research sample is part of the number and characteristics possessed by the population and is calculated using the slovin formula. In this research, the sample that will be taken is the Harapan Kita Nursing Home, Suka Bangun, Sukarami District, Palembang City. The data collection technique used in this study used primary data obtained by researchers directly from research on rheumatoid factor titer analysis with glyceline saline buffer reagent and ready-to-use 0.9% NaCl.

This research was conducted at the Clinical Pathology Laboratory of the Muhammadiyah Palembang Institute of Health Sciences and Technology, located at Ahmad Yani Street 13 Ulu. The stages of this research starting at the preanalytical stage were taking venous blood samples (phlebotomy), making 0.9% NaCl reagent from table salt, separating serum from blood. The analytical stage was in the form of examining the rheumatoid factor using a qualitative method using buffered saline reagent, followed by a semi-quantitative method using buffered saline reagent and readyto-use 0.9% NaCl. In the post-analytic phase, the results of the RF examination (IU/ml) were recorded and data analysis was carried out.

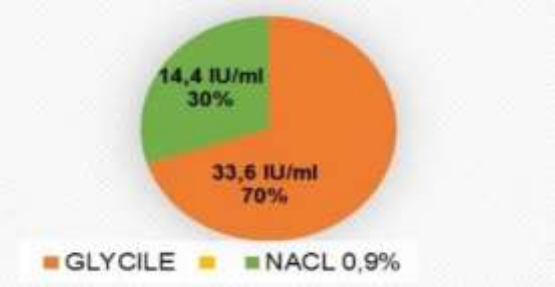
The collected data was analyzed using the SPSS 16.0 application. to determine and see normal data can be done by using the normality test with the Shapiro Wilk test with a probability value of ≥0.05 normally distributed data if <0.05 the data is not normally distributed. If the data is normally distributed, the statistical test is using the Paired sample T test, if the data is not normally distributed, then the alternative test used is the Wilcoxon test.

RESULTS

The average results of Rheumatoid factor examination levels using glycine saline buffer reagent and ready-to-use 0.9% NaCl in this study can be seen in the table below:

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Picture 1.1 RF Check Average Chart

Based on picture 1.1, the results of examining the RF level using glycerin buffer reagent obtained 70% (33.6 IU/ml). Meanwhile, the results of testing the Rf level titer using ready-to-use NaCl reagent with an average amount of 30% (14.4 IU/ml). In determining the hypothesis then proceed with data analysis.

Table 1.1
Normality Test

	Mean	SD	*P*
Glycine Saline Buffer	0.2417	0.03171	0.000
NaCl 0.9% Ready to Use	0.4000	0.30513	0.000

T

he results of the normality test in table 1.1, obtained the results of the significance value (p) data on the results of the RF level titer examination using the reagent glyceline saline buffer and readyto-use 0.9% NaCl of 0.000 which is smaller than 0.005 (0.000 <0.05). It is that the data used in this study were not normally distributed. Therefore, the test is continued with the data transformation test.

Table 1.2
Data Transformation Test Result

	Mean	SD	*P*
Glycine Saline Buffer	0.2417	0.03171	0.000
NaCl 0.9% Ready to Use	0.4000	0.30513	0.000

The results of the data transformation test in table 1.2, obtained the results of the significance value (p) data on the results of the RF level titer examination using the reagent glyceline saline buffer and 0.9% Ready-to-Use NaCl of 0.000 which is smaller than 0.005 (0.000 <0.05). The results of the data transformation test will be followed by the Wilcoxon test.

Table 1.3
Wilcoxon Test Result

	Mean	SD	*P*
Glycine Saline Buffer	33.6000	8.76356	0.001
NaCl 0.9% Ready to Use	14.4000	1.22051	0.001

The results of the Wilcoxon test in table 1.3 show that the significance value (p) of the results of the RF level titer examination using glyceline saline buffer reagent and 0.9% ready-to-use NaCl is 0.001 which is less than 0.005 (0.000 <0.05). The results of the Wilcoxon test

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showed that the hypothesis put forward in this study was that there was a difference in the titers of rheumatoid factor levels using glycerin saline buffer reagent and ready-to-use 0.9% NaCl.

CONCLUSIONS AND SUGGESTIONS

Conclusion

From the research that has been done on differences in RF level titers in the elderly, there are significant differences ρ = 0.001 using ready-to-use Glycine Saline Buffer and 0.9% NaCl reagents. However, the reagents from the two solutions used can be used because they remain stable and have the same pH difference of only 0.2.

Suggestion

As for the research suggestions that have been carried out on "Differences in RF Level Titers in the Elderly Using Glyceline Saline Buffer Reagents and Ready-toUse 0.9% NaCl" is for further research the same test can be carried out but with other parameters such as ASO and CRP.

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CONFLICT OF INTEREST There is no possibility of conflict of interest in the publication of this article.

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