

Comparasion Between Pooled Sera Material and Commercial Serum on the Accuracy of Triglyceride Check

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ABSTRACT

The increase in cases of dyslipidemia every year, requires the Clinical Chemistry laboratory to carry out quality control which is influenced by the assessment of precision and accuracy. These measurements are used with the control material. The laboratory of RSU Mayjen HA Thalib Kerinci uses commercial serum control materials as control materials that are used daily in the triglycerides check, and has never used pooled sera. In fact, there are several advantages to using pooled sera as a control material. The reseach is an analytic survey research with a comparative study method. The sampling technique used was purposive sampling. Data collected by using an observation sheet. Data were processed in computerized with univariate analysis and bivariate analysis using independent t-test. The results showed that the average value of the triglyceride check by using Pooled Sera control material was 94.67 mg / dL with a standard deviation of 2.52, the coefficient of variance was 2.66%. While the test results of triglycerides with Commercial Serum control material was 79.13 mg / dL with a Standard Deviation of 3.57, the coefficient of variance is 4.51%. It was concluded that there was a significant difference between the triglyceride check with Pooled Sera and Commercial Serum materials. It is recommended that the development of medical laboratory technology in hospitals, making this research to be a reference in educational institutions, and for further research on other parameters, including Pooled Sera and other Serum materials.

Keywords: *triglyceride, pooled sera, commercial serum*

1. INTRODUCTION

Economic improvement in some communities has led to a change in diet towards high consumption of animal fat and protein, followed by low excessive consumption. Food intake that exceeds the need will lead to overweight or obesity which is one of the risk factors for various degenerative diseases. Malnutrition and obesity are serious health problems. Overweight as a global problem, occurs because of the increasing prevalence of obesity worldwide as a negative consequence of increasing economic development in Asia-Pacific countries. WHO estimates that about one billion individuals are overweight and about 300 million individuals are defined as obese [11].

The obesity epidemic is believed to arise from bad habits of consuming a diet high in fat and carbohydrates, thus triggering weight gain. Obesity

can also be caused by an energy imbalance for a long time, where energy intake is greater than energy expended [2][1], obesity is often associated with heart disease. Of the cases of heart disease in the world, about 21% are related to obesity. In the blood vessels, fat is in the form of triglycerides which can come from a variety of foods, including those containing carbohydrates. Triglycerides are a type of fat in the body that circulates in the blood and various organs of the body. Monitoring triglycerides means monitoring fat levels that have the potential to increase the risk of cardiovascular disease, such as heart disease and stroke. In normal doses for women 18% and men 15-18%, cholesterol functions to form cell walls, hormones and tissues, but if cholesterol and triglycerides are too much, blood vessels will be blocked, resulting in heart attacks and strokes. In this case, the role of the health laboratory is very important for early

detection of the disease. Examination of triglyceride levels can help change patterns and healthy lifestyles [9].

The health laboratory as a medical support service unit is expected to provide accurate and accurate information about the laboratory aspects of specimens or samples whose tests are carried out in the laboratory. The community wants the quality of laboratory test results to continue to be improved along with advances in science and technology as well as disease development. Health laboratory technology experts consisting of health analysts and other laboratory practitioners must always develop themselves in responding to the community's need for quality assurance of laboratory test results and guidance on providing excellent service. A laboratory is said to be of high quality if the data from laboratory tests can satisfy customers by paying attention to technical aspects such as high precision and accuracy and the data must be recorded properly so that it can be scientifically defended.

Clinical Chemistry Laboratory needs to carry out quality control which is influenced by, among others, an assessment of accuracy and accuracy. These measurements were used with the control material. [15]. Control agents that are often used in clinical chemistry laboratories today are commercial control serums, which are serums made from animal and human serum. The advantage of this type of control material is that it is more durable, can be used for all tests, no need to make your own. The downside is that there are occasional bottle-to-bottle variations plus errors in reconstitution, often serum drawn from animals may not be the same as human serum. Based on the Good Laboratory Practice in the correct Health Laboratory Practice Guidelines [14] in addition to commercial control materials, there are also control materials made by themselves, one of which is serum pool.

Control agents prepared from serum are also known as pooled sera. Pooled sera is a mixture of residual patient serum which is sent to the laboratory every day. According to [28], the advantages of this collection of serum include: easy to obtain, cheap, the material comes from humans, does not need to be dissolved (reconstitution), and the laboratory knows the origin of the control material. The drawbacks are the storage method at -70°C (deep freezer), the stability of some of its components is not guaranteed (eg enzyme activity, bilirubin, etc.) and the danger of infection is very high, so the manufacture of serum collections must be carried out carefully in accordance with laboratory safety guidelines because these ingredients not necessarily free from HIV, HBV,

HCV and others. Seeing the use of control materials in several countries in the world, Ethiopia, Pakistan and other developing countries are faced with unavailability and the high cost of commercial control materials.

Therefore, preparing human serum for internal quality control would be a cost-effective way to obtain control materials for use. In Indonesia itself, based on research by [23] in terms of cost effectiveness, the use of commercial control agents as control agents is more cost-effective than the use of pooled serum as a control agent. Research by [10] also concluded that commercial serum is more effective. Meanwhile, research by [8] states that pooled sera is a good substitute for commercial serum, especially for developing countries. The same thing was also expressed by [13], that the internal Quality Control (QC) made from collected serum is better than commercial internal QC.

General Hospital Major General H.A Thalib Kerinci is a Type C hospital with a health laboratory that performs a lot of triglyceride tests. According to data, the number of triglyceride examinations in 2015 was 609 patients, in 2016 there were 621 patients, in 2017 there were 645 patients, in 2018 there were 702 patients, in 2019 there were 710 patients. Based on the data above, it can be concluded that the number of triglyceride examinations increases every year in the range of 2015 to 2019. With an average number of monthly examinations of around 50 to 59 patients. This shows that cases of dyslipidemia continue to increase from year to year.

Therefore, laboratory examination plays an important role in establishing the diagnosis, especially accuracy in triglyceride examination. RSUD Mayjen H.A Thalib uses commercial control material as a control material that is used daily in triglyceride examination, and has never used pooled sera. In fact, there are several advantages in using pooled sera as control material. Therefore, the authors are interested in researching the quality of pooled sera, whether pooled sera has the same accuracy as commercial serum.

To determine the accuracy, the control material must have a reference value (actual value), so that what will be seen from this research is only accuracy. Based on the above, the researcher conducted a study on "Comparison between pooled sera and commercial serum on the accuracy of triglyceride examination at RSUD Mayjen HA Thalib Kerinci". Kerinci Regency

2. RESEARCH METHODS

This study uses an analytical survey research type with a comparative study method, carried out in February-March 2021 at the laboratory of the General Hospital of Major General H.A Thalib, Kerinci Regency. The population in this study was a collection of serum (not hemolyzed, icteric, and not cloudy) from both male and female patients whose triglyceride levels were normal to be used as control material for Pooled Sera, and Commercial Serum at Mayjen H.A Thalib General Hospital, Kerinci Regency. Samples were serum taken 30 times for triglyceride examination. Sampling technique with purposive sampling technique Distribution .

3. RESULT

Results of triglyceride examination with pooled sera kontrol control material

Table 1. Results of Triglyceride Examination with Pooled Sera control material at Mayjen H.A Thalib Kerinci General Hospital in 2021

Variabel	Mean	SD	Min-Max
<i>Pooled Sera</i>	94.67	2.52	90-98

Based on the data above, it is known that the average value of triglyceride examination with Pooled Sera control material is 94.67 mg/dL with a standard deviation of 2.52, the coefficient of variance is 2.66%, the minimum value is 90, while the maximum value is 2.66%. 98.

Table 2.Result of triglyceride examination with serum control material Commercial at RSU Major General H.A Talib Kerinci in 2021

Variabel	Mean	SD	Min-Max
Serum Komersial	79.13	3.57	73-90

Based on the data above, it is known that the average value of triglyceride examination with Commercial Serum control material is 79.13 mg/dL with a Standard Deviation of 3.57, the coefficient of variance is 4.51%, the minimum value is 73 and the maximum value is 88.

Bivariate analysis was carried out to determine the comparison between Pooled Sera Material with Commercial Serum on the Accuracy of Triglyceride Examination.

Table 3.Comparison between Pooled Sera Ingredients and Commercial Serums on Triglyceride Test Accuracy at RSU Major General H.A Talib

Variabel	t	Df	Sig.(2-Tailed)	Mean	Df	Std. Error Difference	95% Confidence interval of the difference	
							Lower	Upper
Perbandingan Hasil	19.46	3	0.000	15.533	3	0.7980	13.935	17.1309
Pemeriksaan Tri gliserida	19.46	3	0.000	15.533	3	0.7980	13.932	17.1347

Based on the Independent Sample T-Test, the P value or Sig value was obtained. (2-tailed) < (0.05) i.e. 0.000. So it can be concluded that Ha is accepted because of the P value or the value of Sig. (2-tailed) < 0.05, it means that there is a significant difference between triglyceride examination using Pooled Sera and Commercial Serum.

4. DISCUSSION

Results of triglyceride examination with pooled sera kontrol control material Based on the results of the study, the mean value of Pooled Sera obtained from 30 examinations was 94.67 mg/dL and SD ±2.52, CV (coefficient of variance) was 2.66% from the maximum CV value of 5%. Based on the triglyceride test data using the Pooled Sera control material, the maximum value is 98 and the minimum value is 90. The reference value of the

Pooled Sera control material in this study is 36 – 126. So it can be concluded that the results of the Pooled Sera control material examination are accurate. This is in line with research by [22] on comparing the results of triglyceride examination of serum pool control materials with commercial control serum with an average serum pool examination result of 95.42 mg/dL with a CV value of 2.37%, and concluded that the serum pool has high accuracy. good as a control material for triglyceride examination. According to the researcher's assumption, the small value of pooled sera precision is influenced by storage temperature, the storage temperature of control serum made by yourself is at -200C stable for 6 months, stable at 40C for 4 months, at 2 - 80C for 5 days. , at room temperature stable for 1 day. In addition, according to the researchers, the basic ingredients of serum taken from human serum or patient's residual serum also affect the accuracy of pooled sera.

Triglyceride test results with commercial serum controls. Based on the results of the study, the average commercial serum value obtained from 30 examinations was 79.13 mg/dL and SD \pm 3.57, CV (coefficient of variance) was 4.51%. Based on the accuracy, the reference value of the commercial serum control material in this study was 36 – 126, it was concluded that the results of the examination of the commercial serum control substance were accurate. But lacking in accuracy (precision) indicated by the CV value of 4.51% which is close to the maximum CV value of 5%. According to the Ministry of Health Precision (accuracy) is often expressed as Impression (inaccuracy). The smaller the value of CV (%) the more accurate the system/method and vice versa. In line with research by [22] which got a CV value of 6.26%, the researchers concluded that different serum materials from the examined serum affected the accuracy results. The Ministry of Health also mentions that commercial controls are usually taken from animal serum which may not be the same as human serum [14].

According to the researcher's analysis, the value of the precision of commercial serum is influenced by several factors, including the ingredients of the commercial serum that are different from the serum being examined. In addition, serum ingredients are in powder form, requiring dilution so that there is a risk of errors in the method of dilution, calibration and inaccuracy of mixing.

Comparison of pooled sera with commercial serum on triglyceride test accuracy

Based on the results of the independent T statistical test, the significance value of P-value is 0.000, which means the P-value Sig. (2-tailed) <

0.05, then H_a in this study is accepted, which means that there is a difference in the accuracy of triglycerides using Pooled Sera with those using Commercial Serum. This is in line with the research of [1] that there is a difference in the accuracy of blood glucose levels between commercial control serum with abnormally high levels of brand A (sera) and brand B (animal serum), this is indicated by the significance value of Pvalue <0 ,05. In the study of [17], PooledSera which was used as a control material for glucose examination had good quality. The result of calculation of CV (coefficient of variation) Pooled Sera was 5.4% and CV of commercial control serum was 11.6%. The CV Pooled Sera value is closer to the maximum CV value of 5%, so it can be concluded that the accuracy of Pooled Sera as a control material for blood

5. CONCLUSION

The mean level of triglycerides in the pooled serum control material is 94.67 mg/dL

2.The average triglyceride level of the commercial control material is 79.13 mg/dL

3. There is a significant difference in the results of the examination of the triglycerides of the Pooled Sera material and the Commercial Serum material.

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