International Journal of Nursing and Midwifery Science (IJNMS)

http://ijnms.net/index.php/ijnms
ORIGINAL RESEARCH

e- ISSN: 2686-2123
p- ISSN: 2686-0538

A DESCRIPTIVE STUDY ON TRIGLYCERIDE AND BLOOD GLUCOSE LEVELS IN THE ELDERLY POPULATION

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ABSTRACT

Aging is associated with increased risks of metabolic disorders, including hypertriglyceridemia and impaired blood glucose regulation. These conditions significantly contribute to cardiovascular morbidity and mortality in the elderly. Despite their importance, routine screening and management of triglyceride and blood glucose levels in community settings remain limited in many rural and semi-urban regions. This descriptive study aimed to examine triglyceride and blood glucose levels among older adults in Tebel Village, within the working area of the Ganting Public Health Center. A total of 50 elderly individuals were selected using a total sampling technique. Data were collected using a glucometer (On Call) and strip tests (MULTICARE IN TG), with measurements recorded in mg/dL. Univariate analysis was employed to summarise the data using mean, median, standard deviation, range, and 95% confidence intervals. The study received ethical approval (No. 195/KEPK/ITSKES-ICME/IX/2024). The median triglyceride level was 183.00 mg/dL (range: 117.00–347.00 mg/dL), while the median blood glucose level was 135.50 mg/dL (range: 70.00–289.00 mg/dL). The majority of respondents were female (88%), unemployed (74%), and had at least one comorbidity (76%). The results underscore the urgent need for community-based health initiatives focused on early screening, education, and lifestyle modification to manage metabolic health among older adults. Strengthening services such as Posyandu Lansia could play a pivotal role in reducing long-term cardiovascular and metabolic risks in this vulnerable population.

Keywords

Blood Glucose, Triglyceride, Elderly

INTRODUCTION

Degenerative diseases are diseases that occur due to a decrease in the function of the body's organs due to increasing age, and these diseases can last a long time or be chronic. Degenerative diseases are becoming a big problem throughout the world because there is a trend towards an increase in the elderly population. The prevalence of degenerative diseases in Indonesia also continues to increase in line with increasing life expectancy. Heart disease and diabetes mellitus are degenerative diseases whose incidence continues to increase (Sawitri & Maulina, 2022). The global population is experiencing a significant demographic shift, with the number of older adults rising at an

unprecedented rate. One in six people worldwide will be aged 60 years or over (World Health Organization, 2020). As ageing progresses, physiological changes occur, including metabolic alterations that can predispose older individuals to chronic non-communicable diseases (NCDS), such as diabetes mellitus and dyslipidemia. Among the metabolic markers associated with these conditions, blood glucose and triglyceride levels are critical in determining cardiovascular and metabolic health outcomes in the elderly (National Institute for Clinical Excellence, 2023).

The prevalence of metabolic disorders such as hypertriglyceridemia and hyperglycemia is significantly increasing among the elderly. Globally, the International Diabetes Federation (IDF) reported that in 2021, approximately 24% of adults aged 65–99 years were living with diabetes, and this number is projected to rise further in the coming decades. In Southeast Asia, including Indonesia, the situation is particularly concerning due to lifestyle transitions and limited geriatric healthcare coverage. In Indonesia, the Basic Health Research (Riset Kesehatan Dasar or Riskesdas) 2018 revealed that 1 in 3 elderly individuals had elevated blood glucose levels, and over 25% had abnormal lipid profiles, including increased triglyceride levels. These conditions are often underdiagnosed in community settings due to asymptomatic progression and inadequate access to regular screening services (Kaur et al., 2023; National Institute for Clinical Excellence, 2023).

Triglycerides are a type of lipid found in the blood that, when elevated, increase the risk of atherosclerosis, coronary heart disease, and stroke, particularly in older adults with pre-existing metabolic disorders. Similarly, elevated blood glucose levels, commonly observed in elderly populations, are a key indicator of impaired glucose metabolism and may signify undiagnosed or poorly controlled diabetes. Monitoring these parameters is essential to support early detection and management strategies for age-related metabolic diseases. Elderly individuals, especially those residing in rural or semi-urban settings, often have limited access to regular health screening and education. Community-based health services, such as Integrated Health Services for the elderly in Indonesia, provide a strategic opportunity to assess and monitor health indicators among older populations. Descriptive studies conducted in such settings contribute valuable insights into the health status of elderly communities and can inform targeted public health interventions (Liu et al., 2017; Su et al., 2021).

Given the importance of understanding lipid and glucose profiles in elderly populations, this study aims to describe the levels of triglycerides and blood glucose among elderly individuals attending the Integrated Health Services for the elderly. The findings are expected to contribute to the growing body of evidence on metabolic health in ageing populations and support health policy formulation at the community level. This study is particularly important because it provides localised data on elderly individuals in a community-based setting, which remains underreported in the literature. By highlighting the metabolic health status of this vulnerable group, the findings can inform community health programs and policy-level decisions to improve elderly care services in Indonesia. This study aims to provide a descriptive overview of triglyceride and blood glucose levels.

METHOD

This study employed a descriptive design aiming to illustrate the triglyceride and blood glucose levels among the elderly population. A total of 50 older adults from the Integrated Health Services for the elderly in Tebel Village, within the working area of Ganting Public Health Center, were included using a total sampling technique. The instruments used in this study were: (1) a glucometer (On Call) along with a blood

glucose observation sheet (mg/dL), and (2) a strip test (MULTICARE IN TG) accompanied by a triglyceride observation sheet (mg/dL). Data were analyzed using univariate analysis to describe triglyceride and blood glucose variables, presented through the mean, median, standard deviation, minimum and maximum values, and 95% confidence intervals. The Health Research Ethics Commission ethically approved this research under approval number 195/KEPK/ITSKES-ICME/IX/2024.

RESULTS

Table 1 Frequency Distribution Based on Gender, Education Level, Occupation, Comorbidities, and Medications

Variable		n	%
Gender	Male	6	12.0
	Female	44	88.0
Total		**50**	**100.0**
Level of Education	Illiterate	1	2.0
	Elementary School	3	6.0
	Junior High School	17	34.0
	Senior High School	20	40.0
	Collage	9	18.0
Total		**50**	**100.0**
Occupation	Unemployed	37	74.0
	Employed	1	2.0
	Occupational Retirement	12	24.0
Total		**50**	**100.0**
Comorbidity	No Comorbidity	12	24.0
	1 Comorbidity	12	24.0
	2 Comorbidities	18	36.0
	3 Comorbidities	5	10.0
	4 Comorbidities	3	6.0
Total		**50**	**100.0**
Medication	No Medication	20	40.0
	1 Drug	18	36.0
	2 Drugs	6	12.0
	3 Drugs	6	12.0
Total		**50**	**100.0**

Table 2 Average Age of the Elderly in Posyandu in the Ganting Public Health Center Working Area

Variable	Mean	Median	SD	Min-Max	95% CI
Age*	67.16	68.50	9.62	50.00-84.00	64.43-69.89

*Data is normally distributed

Table 3 Mean Triglycerides and Blood Glucose

Variable	Mean	Median	SD	Min-Max	95% CI
Triglyceride	203.52	183.00	56.03	117.00-347.00	187.60-219.44
Blood Glucose Levels	152.94	135.50	60.67	70.00-289.00	135.70-170.18

*Data is normally distributed

Based on Table 1, most respondents were female, accounting for 44 individuals (88.0%). A considerable proportion had completed senior high school education,

totaling 20 respondents (40.0%). Most participants were unemployed, with 37 individuals (74.0%) not engaged in any occupation. Additionally, 18 respondents (36.0%) reported having two comorbidities, and 20 respondents (40.0%) indicated they were not taking any medications. Table 2 shows that the mean age of the respondents was 67.16, with a standard deviation of 9.62. Based on Table 3, the median triglyceride level was 183.00 mg/dL, with the lowest value at 117.00 mg/dL and the highest at 347.00 mg/dL. Meanwhile, the median blood glucose level was 135.50 mg/dL, with the lowest recorded at 70.00 mg/dL and the highest at 289.00 mg/dL.

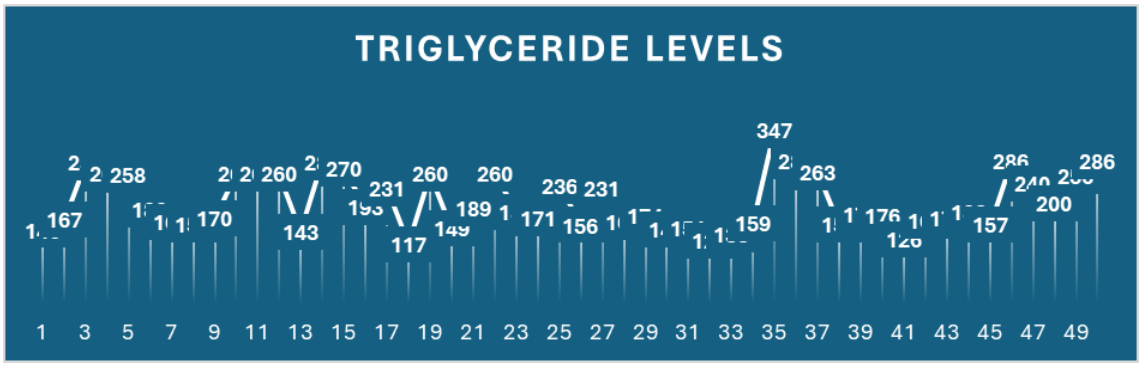

Figure 1. Triglyceride Levels in the Elderly at the Public Health Center

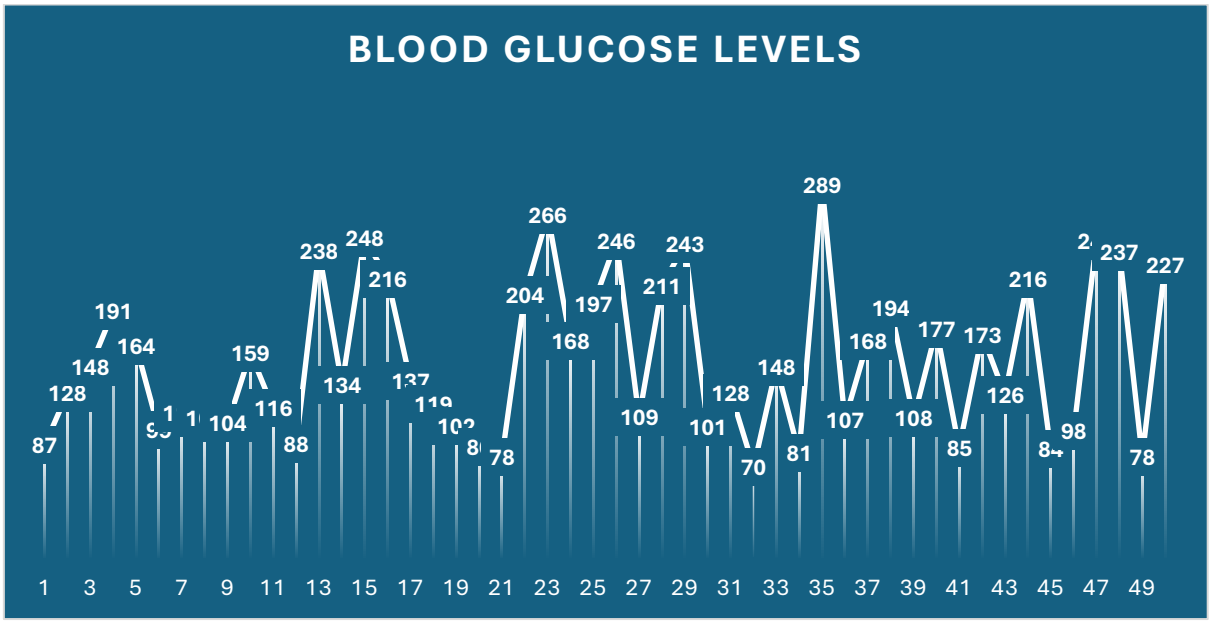

Figure 2. Blood Glucose Levels in the Elderly at the Public Health Center

DISCUSSION

Triglyceride Levels

The findings of this study revealed that the median triglyceride level among the elderly participants was 183.00 mg/dL, indicating a tendency toward hypertriglyceridemia, as levels above 150 mg/dL are typically considered elevated. The findings of this study revealed notable trends in the triglyceride levels of elderly individuals attending the Integrated Health Services for the elderly in Tebel Village, located within the working area of Ganting Public Health Center. The mean

triglyceride levels observed in this population fall within a range that warrants attention, as elevated triglyceride levels have been associated with an increased risk of cardiovascular diseases, particularly in older adults. The results of this study align with previous research highlighting the prevalence of dyslipidemia, including elevated triglycerides, in elderly populations. For instance, a study by Liu et al (2017) indicated that older adults with high triglyceride levels have a higher risk of developing cardiovascular events and other comorbidities. Similarly, the high median triglyceride levels observed in this sample support the notion that dyslipidemia is prevalent among older adults and should be closely monitored as part of routine health assessments in community-based health services.

In addition to cardiovascular risks, elevated triglyceride levels in the elderly are often indicative of metabolic disorders, such as insulin resistance, which are more common in aging populations. These findings are consistent with those of (de la Torre Hernandez et al., 2022), who noted that dyslipidemia and abnormal lipid profiles, including high triglycerides, are often present in elderly individuals with impaired glucose metabolism, further increasing their risk of type 2 diabetes and cardiovascular diseases. Interestingly, a considerable portion of the study participants had triglyceride levels higher than the recommended threshold for optimal health, which is typically less than 150 mg/dL. This finding suggests the need for targeted health interventions aimed at improving lifestyle factors such as diet and physical activity, as well as the potential benefit of early screening for dyslipidemia in elderly populations (Wang et al., 2022).

The findings from this study highlight important trends in the metabolic health of elderly individuals, specifically regarding triglyceride and blood glucose levels. The results show that a large proportion of the elderly population in this study has elevated triglyceride levels, which are consistent with previous studies that report high levels of dyslipidemia in aging populations. Elevated triglycerides are considered a major risk factor for cardiovascular diseases, and managing these levels in elderly individuals is crucial for preventing associated complications such as stroke, heart disease, and diabetes. Furthermore, the findings of this study underscore the importance of accessible community-based health programs, such as Integrated Health Services for the elderly, in managing the metabolic health of the elderly. These programs, which provide regular health screenings and follow-up care, have the potential to significantly improve health outcomes in elderly populations, particularly in rural and semi-urban areas. Research has shown that community health interventions focused on early detection and regular monitoring of health indicators, such as lipid levels and blood glucose, are effective in reducing the incidence of chronic diseases among elderly individuals (Tao et al., 2022; Z. Wu et al., 2024; Ye et al., 2019).

Blood Glucose Levels

The results of this study demonstrate that blood glucose levels in the elderly participants were generally higher than what is typically considered normal. The median blood glucose level recorded was 135.50 mg/dL, with values ranging from 70.00 mg/dL to 289.00 mg/dL. These findings are consistent with research showing that elderly individuals are at a higher risk of developing impaired glucose metabolism, including prediabetes and type 2 diabetes. Elevated blood glucose levels, particularly in older adults, are a

major concern due to the increased risk of microvascular and macrovascular complications. Long-term hyperglycemia can lead to conditions such as diabetic retinopathy, neuropathy, and nephropathy, as well as contributing to the development of cardiovascular diseases. The higher blood glucose levels found in this study align with the notion that aging is associated with a decline in insulin sensitivity, which can contribute to insulin resistance and dysglycemia (Gao et al., 2017; Y. Wu et al., 2021).

In this study, a significant portion of participants had blood glucose levels in the higher range, which further supports the need for regular screening of glucose levels in elderly populations. Previous studies have shown that routine screening can help in the early detection of impaired fasting glucose (IFG) or diabetes, which are conditions that often go undiagnosed until they cause severe complications. Implementing preventive measures, including lifestyle interventions such as physical activity and dietary modification, effectively reduces the incidence of diabetes in older adults. Additionally, the role of medication adherence cannot be overlooked. Elderly individuals with higher blood glucose levels often require pharmacological intervention to manage their condition. Insulin therapy or oral glucose-lowering medications, such as metformin, are commonly prescribed to improve glycemic control in diabetic and prediabetic individuals. However, studies have demonstrated that elderly patients often struggle with medication adherence, which can result in poor glycemic control and increased risk of complications. This highlights the importance of community-based health programs, such as Integrated Health Services for the elderly, which can provide consistent monitoring, education, and support to ensure adherence to medication regimens and improve long-term health outcomes (Kim et al., 2024; Lee et al., 2022).

Furthermore, blood glucose levels in the elderly should be monitored alongside other risk factors, such as blood pressure, lipid profiles, and weight, to provide a comprehensive approach to managing metabolic health. Programs integrating screening for multiple chronic conditions can offer a holistic approach to health promotion and disease prevention, improving individual and public health outcomes. In conclusion, the results of this study underline the importance of monitoring blood glucose levels in elderly populations, as elevated levels can significantly increase the risk of developing severe health conditions. Regular screening, lifestyle modifications, and medication adherence are key factors in managing blood glucose levels effectively and reducing the risk of complications in elderly individuals.

CONCLUSIONS

This study provides a descriptive overview of triglyceride and blood glucose levels among elderly individuals attending the Integrated Health Services in Tebel Village. The findings reveal that many participants exhibited elevated triglyceride and blood glucose levels, underscoring the metabolic vulnerabilities commonly observed in aging populations. These results highlight the critical role of routine screening, lifestyle interventions, and community-based health services such as Integrated Health Services for the elderly in the early detection and management of metabolic risk factors. Strengthening preventive health programs targeting elderly individuals, particularly in rural and semi-urban areas, is essential to improve their long-term cardiovascular and metabolic health outcomes.

REFERENCES

de la Torre Hernandez, J. M., Palop, R. L., Mazuecos, J. J. M., Sáez, P. C., Gutierez-Barrios, A., Pinar, E., Cid, B., Fernandez, L., Camarero, T. G., Urbano-Carrillo, C., Dominguez, J. F. O., Diaz, V. A. J., Menchero, A. E. G., Fernández, E. G., Soriano, J. G. C., Ocaranza, R., Úcar, E. A., Roman, K. G. S., Leal, S., … de Prado, A. P. (2022). Prospective application of a bleeding and ischemic risk-adjusted antithrombotic protocol in elderly patients revascularized with everolimus-eluting stents: EPIC05-Sierra75 study. *Journal of Geriatric Cardiology*, *19*(5), 354–366. https://doi.org/10.11909/j.issn.1671-5411.2022.05.009

Gao, Y. X., Man, Q., Jia, S., Li, Y., Li, L., & Zhang, J. (2017). The fasting serum triglyceride levels of elderly population with different progression stages of diabetes mellitus in China. *Journal of Diabetes and Its Complications*, *31*(12), 1641–1647. https://doi.org/10.1016/j.jdiacomp.2017.08.011

Kaur, P., Kannapiran, P., Ng, S. H. X., Chu, J., Low, Z. J., Ding, Y. Y., Tan, W. S., & Hum, A. (2023). Predicting mortality in patients diagnosed with advanced dementia presenting at an acute care hospital: the PROgnostic Model for Advanced DEmentia (PRO-MADE). *BMC Geriatrics*, *23*(1), 1–13. https://doi.org/10.1186/s12877-023-03945-8

Kim, I., An, H., Yun, S., & Park, H. Y. (2024). Effectiveness of community-based interventions for older adults living alone: a systematic review and meta-analysis. *Epidemiology and Health*, *46*, 1–10. https://doi.org/10.4178/epih.e2024013

Lee, S. H., Park, S. Y., & Choi, C. S. (2022). Insulin Resistance: From Mechanisms to Therapeutic Strategies. *Diabetes and Metabolism Journal*, *46*(1), 15–37. https://doi.org/10.4093/DMJ.2021.0280

Liu, Z., Burgess, S., Wang, Z., Deng, W., Chu, X., Cai, J., Zhu, Y., Shi, J., Xie, X., Wang, Y., Jin, L., & Wang, X. (2017). Associations of triglyceride levels with longevity and frailty: A Mendelian randomization analysis. *Scientific Reports*, *7*, 1–8. https://doi.org/10.1038/srep41579

National Institute for Clinical Excellence. (2023). Cardiovascular disease: risk assessment and reduction, including lipid modification. *NICE Guidance CG238*, *July 2023*. https://www.ncbi.nlm.nih.gov/books/NBK554923/

Sawitri, H., & Maulina, N. (2022). Gambaran Kadar Profil Lipid pada Lansia di Panti Jompo Kota Lhokseumawe Tahun 2021. *GALENICAL : Jurnal Kedokteran Dan Kesehatan Mahasiswa Malikussaleh*, *1*(2), 53. https://doi.org/10.29103/jkkmm.v1i2.8220

Su, Y., Wang, S., Sun, J., Zhang, Y., Ma, S., Li, M., Zhang, A., Cheng, B., Cai, S., Bao, Q., & Zhu, P. (2021). Triglyceride Glucose Index Associated With Arterial Stiffness in Chinese Community-Dwelling Elderly. *Frontiers in Cardiovascular Medicine*, *8*(September), 1–9. https://doi.org/10.3389/fcvm.2021.737899

Tao, L. C., Xu, J. ni, Wang, T. ting, Hua, F., & Li, J. J. (2022). Triglyceride-glucose index as a marker in cardiovascular diseases: landscape and limitations. *Cardiovascular Diabetology*, *21*(1), 1–17. https://doi.org/10.1186/s12933-022-01511-x

Wang, R., Yu, X., Wang, Z., Liu, Y., Chen, H., Liu, S., Xu, C., Chen, Y., Ge, X., Xia, D., Chang, R., Xu, G., Xiang, M., Wang, Y., Shen, T., Hu, F., & Cai, Y. (2022). Blood lipid levels and all-cause

mortality in older adults: the Chinese Longitudinal Healthy Longevity Survey 2008-2018. *Epidemiology and Health*, *44*, 1–10. https://doi.org/10.4178/epih.e2022054

World Health Organization. (2020). Decade of Healthy Ageing Decade of Healthy Ageing Functional Ability Intrinsic Capacity. In *World Health Organization* (Vol. 20, Issue February). https://www.who.int/publications/i/item/9789240017900

Wu, Y., Hu, H., Cai, J., Chen, R., Zuo, X., Cheng, H., & Yan, D. (2021). Applying latent class analysis to risk stratification of incident diabetes among Chinese adults. *Diabetes Research and Clinical Practice*, *174*, 108742. https://doi.org/10.1016/j.diabres.2021.108742

Wu, Z., Gao, J., Chen, S., Wang, G., Liu, H., Wang, X., Sun, P., Yu, X., Yang, Q., Wu, S., & Zhou, X. (2024). Triglyceride levels and risk of cardiovascular disease and all-cause mortality in Chinese adults younger than 40 years old: a prospective cohort study. *Cardiovascular Diagnosis and Therapy*, *14*(2), 240–250. https://doi.org/10.21037/cdt-23-412

Ye, X., Kong, W., Zafar, M. I., & Chen, L. L. (2019). Serum triglycerides as a risk factor for cardiovascular diseases in type 2 diabetes mellitus: A systematic review and meta-analysis of prospective studies. *Cardiovascular Diabetology*, *18*(1), 1–10. https://doi.org/10.1186/s12933-019-0851-z