

## ANALYSIS PLUMBUM CONCENTRATION IN THE BLOOD COMMUNITY YOUTEFA BAY CITY OF JAYAPURA PROVINCE PAPUA

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### ABSTRACT

*The presence of Plumbum in the body can disrupt the homeopoetic system in heme synthesis and may cause health problems in humans such as secondary sideroblastic anemia. The purpose of this study is to determine the level of blood plumbum in people who live in the Bay of Youtefa Jayapura City of Papua. This research is a quantitative descriptive research. The subject is 40 respondents. Examination of plumbum levels in the blood using Quantum Resonance Analyze tool. 40 people who checked plumbumnya level known 39 people or 97.5% of people living in Youtefa Bay plumbum levels in blood raising > 0.64 µg / dl. The average blood plasma level is 1.05 µg / dl with SD = 0.24 µg / dl Based on this study, it is also seen that the age group that has the highest blood plumbum level is the age group > 64 years ie 6 people ( 15%) and the lowest is the age group 25-29 years ie 1 person (2.5%). Plumbum, blood level 97.5% in the range of high risk to caused disease.*

**Keywords:** *Plumbum, Blood, Concentration*

### A. BACKGROUND

The form of Plumbum (Pb) Chemistry is an important factor that influences the properties of Plumbum today. Organic plumbum components such as tetraethyl plumbum can be absorbed immediately by the body through the skin and mucous membranes. Organicplumbum is absorbed mainly through the digestive and respiratory tract and is the main source of Plumbum in the body. Not all Plumbums that are sucked or swallowed into the body will be left in the body. Approximately 5-10% of the amount ingested will be absorbed through the digestive tract, and approximately 30% of the amount sucked through the nose will be absorbed through the respiratory tract will stay in the body because it is affected by the size of the particles (Lubis, et al., 2013).

Plumbum content in the blood represents a balance between the amount of plumbum that enters the body with plumbum which is excreted from the body, which can also describe the presence of plumbum in soft tissues and hard tissues. It is also known that the content of plumbum contained in the blood and soft tissue

components is 1% of the total plumbum that enters the body, and around 90-99% of plumbumin the blood is found in erythrocytes (Lubis, et al, 2013) Plumbum affects the function of the enzyme coproporfirinogen oxidase in Hemoglobin synthesis (Palar, 1994).

Increased ALA levels will affect porphobilinogen formation and 9-protoporphyrin. Protoporpyrin-9 which accumulates in red blood cells can cause a decrease in red blood cell count and a reduction in the age of red blood cells. Along with this phenomenon, Hb synthesis will be inhibited (Palar, 1994). Protoporphyrin increase in children occurs if there is a plumbum content in the blood of 14-17 micrograms / dl (Musthapia & Sunanrno, 2006). Based on the above background, research is conducted with the aim is to find out the level of blood plumbum in the community living in Youtefa Bay, Jayapura City, Papua.

### B. SUBJECT AND METHOD

This research is a quantitative descriptive study with a cross sectional approach. The sample is 40 respondents taken by purposive sampling sampling technique, so that

in determining the sample, the researcher sets the following criteria:

- b.1. Willing to be a respondent
- b.2 Living in Youtefa's arms > 2 years

Examination of plumbum levels in the blood using the Quantum Resonance Analyze tool.

**C. RESEARCH RESULTS**

Based on the results of the study it was found that from 40 people examined 39 people or

Table 1. Distribution of respondents based on age groups and blood plumbum levels in Youtefa Bay, Jayapura City

Age group	Plumbum content				Total	
	> 0.64 µg / dl		< 0.64 µg / dl		N	%
	F	%	F	%		
<25	1	2.6	0	0	1	2.5
30-34	4	10.3	0	0	4	10
35-39	5	12.8	0	0	5	12.5
40-44	5	12.8	0	0	5	12.5
45-49	5	12.8	0	0	5	12.5
50-54	4	10.3	0	0	4	10
55-59	5	10.3	1	2.6	6	15
60-64	5	12.8	0	0	5	12.5
> 64	5	12.8	0	0	5	12.5
amount	39	97.5	1	0.25	40	100

97.5% whose plumbum levels were > 0.64 µg / dl or high blood levels of plumbum. Based on this study also showed that age groups with high plumbum levels were groups of 30-34 years, 35-39 years, 55-59 and > 64 years age groups, namely 5 people (12.8%) and the lowest was <25 years age group is 1 person (2.5%). The results of this study illustrate that the people who live around Youtefa Bay have actually been exposed to plumbum. The following table:

Figure 1. Concentration of plumbum by age group and plumbum levels

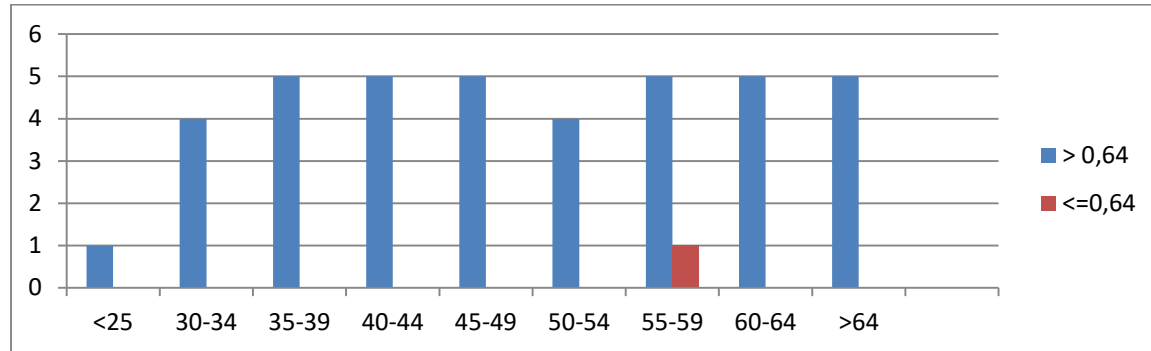


Figure 2. The Concentration in percentage

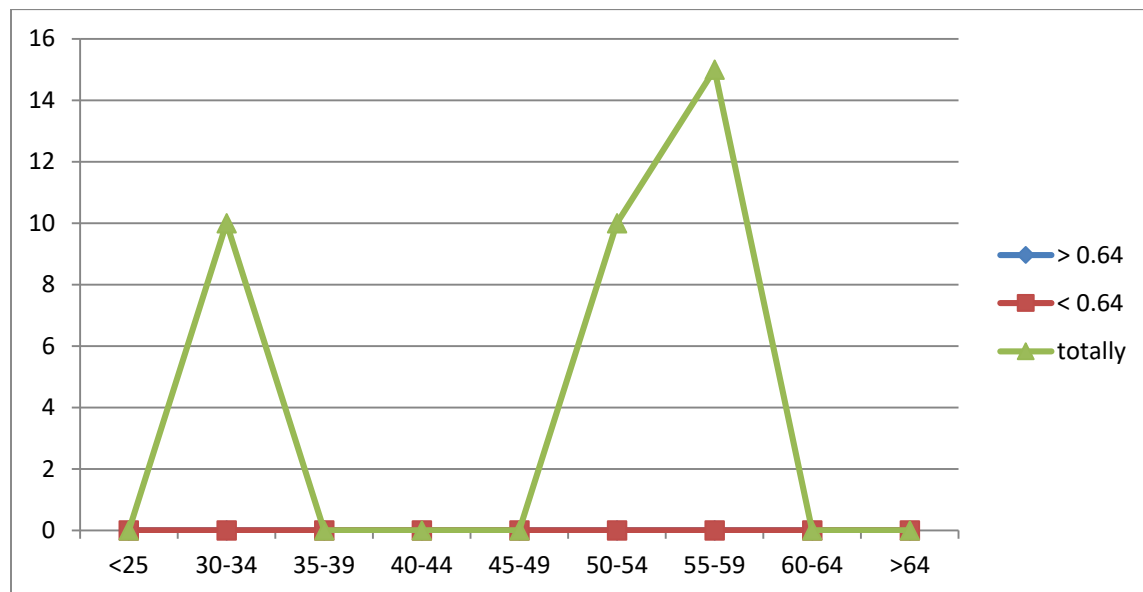


Table. 2. Mean number, median, minimum, maximum of blood Plumbum (Pb) levels.

Variable	Mean				Elementary school
	Median	Minimum	Maximum		
Blood Pb level	1.05	1.04	0.64	1.51	0.244

**D. DISCUSSION**

The results of this study are in line with the results of Tan Malaka and Meiri Iriyani's research in

Jakarta which found high blood levels of plumbum in Jagorawi Tol officers ranged from 8.5 µg% -

22.9 µg% (standard deviation = 1.1) evenly of 20 µg% (Malaka & Iriyani, 2012) .

The same thing was found by Wahyu who found the mean blood plumbum level in motorized vehicle mechanics in Pontianak City was 1.828 g / dl in blood profile where the plumbum level in mechanical blood was related to leukocyte and platelet levels with p-value values of 0.034 and 0.022, respectively. The same thing was found by Agung Laksana et al, at the Purwokerto Kembaran Puskesmas in 2012 which found that blood levels of plumbum in pregnant women were high. The results of Laksana's study found that out of 93 respondents surveyed, 88.2% of respondents had high levels of plumbum , with an average Plumbum level of 28.68 µg / dl (Laksana, Widiastuti, & Indriani, 2012) .

This research is the same as the results of research conducted by the Department of Biomedical Sciences, University School of Veterinary Medicine, which found that there were 70 incidences of high plumbum levels in cat's blood due to exposure to plumbum (Kazuhiko, 2013) . Based on the results of the study, it was found that the proportion of plumbum concentrations in women of childbearing age was found to have 10 women (25%) people with high plumbum levels. This is something that needs attention because according to the *American Conference on Governmental Industrial Hygienists* (ACGIH) that for women of childbearing age, if the blood plumbum exceeds 10 µg / dl, it can give birth to a child at risk of cognitive abnormalities. According to the *Occupational Safety and Health Administration* (OSHA) , that if plumbum levels in the work environment reach 40 µg / dl of workers exposed for 30 days or more then health surveillance must be carried out. Health surveillance includes blood tests including plumbum and zinc protoporphyrin (ZPP). If exposure to lead is quite low, ie below 40 µg / dl in blood, monitoring is carried out every 6 months. (Malaka & Iriyani, 2012).

If the blood plumbum of a worker reaches more than 40 µg / dl, it must be monitored every 2 months to decrease to less than 40 µg / dl. If the content of plumbum in the blood reaches 60 g / dl or more then the US-OSHA mengharuskan the worker is transferred or paused then conducted surveillance of every month and may only be working again after the content of plumbum in the blood falls below 40 g / dl (Malacca & Iriyani, 2012).

According to Fardiaz (1992), organic plumbum components such as tetraethyl plumbum, can immediately be absorbed by the body through the skin or mucous membrane. This is a problem for fishermen who live in Youtefa Bay because based on interviews with fishermen and residents, they are exposed to sea water contaminated with Plumbum in a day which is 180 minutes per day or 3 hours per day. In the human body, plumbum can inhibit the activity of enzymes involved in the formation of hemoglobin which can cause anemia (Rangkuti, 2009).

The presence of plumbum in the body can interfere with the hemop system in heme synthesis through three mechanisms, that is, it can first interfere with the union of Glycine and Succinyl Co-Enzyme A. Secondly through depression against delta-ALAD, and thirdly through interference with enzymes Ferrochelatase which functions to attach iron (Fe) to protoporphyrin which then becomes heme part of hemoglobin (Malaka & Iriyani, 2012) .

Heavy metals besides being absorbed through the skin can also enter the body through food and drinks and will be digested in the duodenum and will be transported by plasma (albumin). Albumin will be associated with proteins that will be circulated to certain parts of the body that need and accumulate in the liver, kidneys, hair and nail tips. Heavy metals can also be excreted through feces, urine and Gibson 1990 respiratory respiration and Linder 1992 in (MS Saeni & Wuryandari, 1995) .

The results of this study are in line with the research of Carlos JS Passos (2008) in the Amazon, which attempts to review mercury exposure to the environment and human health throughout the Amazon (Passos & Mergler, 2008)

I saw the results of a study in Youtefa Bay that found plumbum levels in the blood were quite high and exceeded the USEPA standard which tolerated 40 µg / dl. The results of this study need to be taken seriously by the municipal government of Jayapura to find a way out of this problem, given the high levels of Plumbum in the blood, and high Plumbum levels in fish, seawater and shellfish, it is necessary to have a realistic urgent solution, considering the Gulf waters Youtefa is used by some people as a source of livelihood, contaminated fish have been a good source of protein and omega-3s for health, but the high protein and omega-3 content is a dilemma due to pollution in these fish.

According to Nu G Raini (2007) that to create a development that is environmentally sound, pollution is one of the important factors that need to be considered. In accordance with national development, namely the complete development of Indonesian people and the development of Indonesian society. Human interests such as health, safety, welfare and comfort (K4). To go to K4 above, it is necessary to maintain complete harmony, harmony, equilibrium and roundness in each development activity.

Pollution is a complicated problem, because it involves matters relating to physical characteristics, sources of pollutant emissions (kinds of sources, rate of pollution, speed and high emissions, climate elements that influence the spread of pollutants in locations where pollutants are emitted and climatic conditions locally in the area receiving air pollution). Air as one of the natural resources that cannot be renewed, is a major requirement for humans, animals and plants in sustaining their lives. Because according to Nugraini (2007) the environment needs to be maintained,

through monitoring, regulating and limiting its use so as not to exceed the limits that are still allowed for life. Air pollution can be caused by human activities, among others by industry, transportation equipment, power plants, household activities and offices (Nugraini, 2007).

## BIBLIOGRAPHY

1. Palar, H. (Ed.). (2004). *Heavy Metal Pollution and Toxicology*. Jakarta: PT. Rineke Cipta.
2. Musthaphia, I., & Sunanrno, MTD (2006). *Impact of Lead Pollutants on Fish and Humans*. Paper presented at the National Limnology Seminar, Jakarta.
3. Malacca, T., & Iriyani, M. (2012). Relationship of Lead Levels in Blood with Levels Hemoglobin and Hematocrit on Toll Door Officers.
5. Iagorawi. *Journal of National Public Health*, v. 6. No. August 1, 2011.
6. Kurniawan, W. (2008). *Relationship of Pb Level in blood with Blood Profile on motor vehicle mechanics in Pontianak City*, Diponegoro University, Semarang.
7. Laksana, ASD, Widiastuti, R., & Indriani, V. (2012). *Effect of plumbum levels in the blood on the effectiveness of therapy for anemia gravidarum with iron tablets*. Paper presented at the National Health Seminar, Purwokerto.
8. Kazuhiko, A. (2013). 7 Dangers caused by lead, from <http://www.gomuda.com/2013/01/inilah-7-bahaya-yang-disuksi-timbal.html>
9. MSSaeni, & Wuryandari, H. (1995). Pollution of Pb, Cd and Cu in Kale, Spinach and Water Against Pollution in Hairs in Retrieved Bogor Municipality February 15, 2013, from [http://lepository.ipb.ac.id/bitsteramhandle/123456789/25948m.saeni\\_rk.pdf?sequence=pdf](http://lepository.ipb.ac.id/bitsteramhandle/123456789/25948m.saeni_rk.pdf?sequence=pdf)
10. Passos, CJS, & Mergler, D. (2008). Human mercury exposure and adverse health effects in the Amazon: a review. *saude Publica, Rio de Janeiro, september 24*.
11. Nugraini, NR (2010). Environmental Health Risk Assessment of Hydrogen Sulfide Pollutants in Ambient Air. *Ecolab*, 4 no. 1 1-54.