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Effect of Age, Gender, and Intake Rate on Public Health Complaint Around the Traditional Gold Mining, Kuantan Hilir District, Kuantan Singingi Regency, Riau Province

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Abstract

The research objective is to analyze effect of age, gender, and intake rate on public health complaint around the Traditional Gold Mining, Kuantan Hilir District, Kuantan Singingi Regency, Riau Province. This research is quantitative with a cross sectional research design. The population is people who use wells as a source of drinking water and are in 3 villages located on the banks of the river near the location of the Traditional Gold Mining, Kuantan Hilir District, Kuantan Singingi Regency, namely Kasang Limau Sunda Village 38 families, Teratak Jering Village 96 families, and Rawang Village Oguang 567 families with a total of 701 families. The sample in this study are people who consumed water from dug wells in the area around the Gold Mining in 3 villages in Kuantan Hilir District, namely Kasang Limau Sundai Village, Teratak Jering Village, and Rawang Oguang Village. Sampling was done by purposive sampling. After calculating the known population in the 3 villages amounted to 701 families, then obtained a sample of 84 research samples. Data analysis used multivariate analysis. The results show that age has effect on public health complaint around the Traditional Gold Mining, Kuantan Hilir District, Kuantan Singingi Regency, Riau Province. Gender and intake rate have no effect on public health complaint around the Traditional Gold Mining, Kuantan Hilir District, Kuantan Singingi Regency, Riau Province.

Keywords
Age; gender; intake rate; public health; complaint

I. Introduction

One of the most common mining activities in Indonesia is gold mining. Gold mining activities in Indonesia have existed for a long time, both legally and illegally, this mining is spread from east to west of Indonesia. Riau Province is one of the provinces located on the island of Sumatra and is also known as a province that has the potential for mining and mineral resources, this potential includes oil, coal, to precious metals such as gold.

Traditional gold mining or Unlicensed Gold Mining is an illegal or unofficial mining site and does not get a permit from the government, both at the provincial and district levels, which is run by a group of people. Unlicensed Gold Mines are often located along a river in a rural area. Gold mining is indeed an activity that can increase people's income, however gold mining can also be detrimental if in its implementation it is not followed by a proper processing of gold ore processing waste. The method of processing gold ore is an amalgamation process that uses toxic hazardous materials in its processing, namely mercury (Hg). Mercury or mercury has the scientific name hydrargyrum is a chemical element with the symbol Hg and has an atomic number of 80 with an isotope of

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202 with a half-life of 444 years. Mercury is a silvery heavy metal, but is a weak conductor of heat (Sembel, 2015). Tradition is something that is passed down from the heritage of the ancestors to the next generation in a relay descends performed by the indigenous communities that have become deeply entrenched the culture in life. (Purba, N. 2020)

Traditional mining still uses amalgamation techniques in its processing, which is a process that uses mercury as a tool to hold or bind gold and separate it from stone grains. The initial problem occurred in this process, where the remaining water in the coils containing mercur y was discharged directly into the river, following the waste stream which empties into a watershed which is only 50–100 m from residential areas. It is feared that the mercury content in the river is still quite high because most of the gold processing machines along the river flow the washing process water waste into the river, where the water is used by the surrounding community for various needs and the community also processes dug well water into water for consumption. Some galundung business processors or stone milling machines also make disposal by digging the soil to a depth of several meters around the galundung business as a direct disposal site for the remaining processing water containing mercury.

Unlicensed gold mining activities have been rampantly carried out in recent years in Riau Province and are generally carried out on the banks of major rivers, one of the regencies whose environmental damage is starting to become apparent, namely Kuantan Singingi Regency. The emergence of gold mining activities without permits has caused many residents to switch professions to become Unlicensed Gold Mining workers, especially those who work as rubber farmers, this is because it is more economically profitable (Rezki et al., 2017).

Mercury is used as an auxiliary chemical which is suitable for its properties to bind gold grains for easy separation from other particles. The way of mining gold and processing gold ore by illegal miners is very simple, but due to their simplicity and ignorance and indifference has brought bad consequences for survival in the environment around the location of Unlicensed Gold Mining which has the potential to cause toxic effects on the aquatic environment and will have negative impacts for gold miners and communities around the location of Unlicensed Gold Mining who use water from river flows where waste from gold mining is disposed of. As a result of exposure to mercury, it can cause disturbances in the nervous system, kidneys, respiratory tract, and skin.

Mercury is also one of the hazardous substances, exposure to mercury has many impacts on human health, besides causing short-term effects, it can also cause long-term effects on health. Continuous exposure to mercury results in permanent organ damage, such as the brain, kidneys and gastrointestinal tract. Mercury toxicity levels ranging from 50-100 g% will begin to show symptoms of poisoning. The signs of a sufferer of chronic poisoning can be seen in the eye organs. Usually, the lens of the patient's eye looks gray to dark. Health problems caused by exposure to high mercury in a short time are lung damage, vomiting, increased blood pressure and heart rate.

Based on the Government Regulation of the Republic of Indonesia Number 82 of 2001 concerning Management of Water Quality and Control of Water Pollution, that water pollution is the entry or inclusion of living things, substances, energy, and or other components into water by human activities, so that water quality drops to the level of certain conditions that cause water to not function according to its designation.

Based on the Law of the Republic of Indonesia Number 11 of 2017, mercury or mercury (Hg) is one of the heavy metals that is very dangerous for health and the environment because it is toxic, persistent, bioaccumulates and can move long distances

in the atmosphere. With the help of bacteria in sediments and waters, mercury turns into methyl mercury which is more harmful to health because it enters the food chain. Mercury also often enters the environment through the process of disposing of domestic and industrial waste (batteries, burning inflorescence lamps, medical products, thermometers, barometers, thermostats, etc.), burning forests, burning the remains of domestic waste in the environment. landfills, especially in urban areas and smelters (Sembel, 2015).

Difficult to get water and clean water is a problem for people in rural areas or villages, with rivers in their areas of residence, people living around watersheds make river water as a source of water they need, for example for drinking water, bathing water or for drinking water. washing, and the problem is now the river water is not clean and does not meet the requirements for clean water or drinking water. Rivers that have been polluted, especially due to gold mining activities in the surrounding area, can pollute the river.

Environmental health risk analysis is an assessment or assessment of health risks that can occur at any time in a human population at risk. This predictive study produces quantitative risk characteristics, risk management options and communication strategies to minimize these risks. Environmental quality data that are agent-specific and site-specific, anthropometric characteristics and activity patterns of the exposed population are needed in this study and can be used as guidelines to improve public health in traditional gold mining areas contaminated by mercury.

Kuantan Singingi is a district in Riau Province, there is one long river that passes through many villages, namely the Batang Kuantan River. Currently, water pollution, especially in open waters (rivers) is a serious problem. Kuantan Singingi Regency is a developing area characterized by complex problems, especially in the mining sector. This is marked by the increasing number of community gold mining activities or so-called traditional gold mining and Unlicensed Gold Mining which are found in several locations along the river in Kuansing Regency which have been operating for the last 14 years. Kuantan Hilir Seberang District is one of the sub-districts with Unlicensed Gold Mining activities. The water in the watershed is used by the community to meet their daily needs.

Based on this report, it is also known that at one traditional gold mining location in Kuantan Hilir Seberang District, Kuantan Singingi Regency, Riau, there are about 60 gold mining locations in the sub-district. This is the basis for researchers to analyze health complaints in communities around traditional gold mining areas.

Observations were made through interviews with several residents who live around rivers and use river water as a source of water in their daily activities, as many as 76.6% experienced nausea and vomiting, 60% experienced diarrhea, 70% experienced headaches, and 63.35 experienced headaches stomachache after rampant illegal mining in the surrounding area.

The latest survey was also conducted to see mercury contamination in the wells of residents around the river where traditional mining areas are located, that mercury yields of 0.0016 mg/l were found in wells about 100 meters from the river. Surveys of mercury contamination in watersheds around gold mining are routinely carried out to monitor contamination levels as a reference in preventing possible consequences.

The research objective is to analyze effect of age, gender, and intake rate on public health complaint around the Traditional Gold Mining, Kuantan Hilir District, Kuantan Singingi Regency, Riau Province.

II. Research Method

This research is quantitative with a cross sectional research design. Quantitative research is an attempt by a researcher to find knowledge by providing data in the form of numbers (Octiva et al., 2018; Pandiangan, 2018). Cross sectional research design because in this study design all variables are measured and observed at the same time so that it is easier for researchers to conduct research (Asyraini et al., 2022; Octiva, 2018; Pandiangan, 2015).

Population is the complete set group of individuals, whether that group comprises a nation or a group of people with a common characteristic (Jibril et al., 2022; Pandiangan et al., 2018; Pandiangan, 2022). The population is people who use wells as a source of drinking water and are in 3 villages located on the banks of the river near the location of the Traditional Gold Mining, Kuantan Hilir District, Kuantan Singingi Regency, namely Kasang Limau Sunda Village 38 families, Teratak Jering Village 96 families, and Rawang Village Oguang 567 families with a total of 701 families. The sample in this study are people who consumed water from dug wells in the area around the Gold Mining in 3 villages in Kuantan Hilir District, namely Kasang Limau Sundai Village, Teratak Jering Village, and Rawang Oguang Village. Sampling was done by purposive sampling, that is, the sample was selected based on the criteria in accordance with the objective (Octiva et al., 2021; Pandiangan et al., 2021; Pandia et al., 2018). After calculating the known population in the 3 villages amounted to 701 families, then obtained a sample of 84 research samples.

Data analysis used multivariate analysis. Multivariate analysis is a set of statistical models that examine patterns in multidimensional data by considering, at once, several data variables. This is an extension of bivariate data analysis, which only considers two variables in the model (Pandiangan et al., 2022; Tobing et al., 2018).

III. Result and Discussion

3.1 Overview of Research Locations

Kuantan Singingi Regency is geographically, geoeconomically and geopolitically located in the middle lane across Sumatra and is in the southern part of Riau Province, which is a division of Indragiri Hulu Regency which was formed based on Law Number 53 of 1999 concerning the Establishment of Pelalawan, Rokan Hulu, Rokan Hilir, Siak, Natuna, Karimun, Kuantan Singingi Regencies and Batam City. Kuantan Singingi Regency consists of 12 sub-districts with an area of 7,656.03 km^2, which is located between 0000 -10 00 South Latitude and 1010 02 - 1010 55 East Longitude.

Kuantan Hilir Seberang District is one of the sub-districts in Kuantan Singingi Regency which originates from the expansion of Kuantan Hilir District. The area of Kuantan Hilir Seberang District according to the measurements of the Kuantan Hilir Seberang District Office is + 105.40 km^2.

Kuantan Hilir Seberang District includes 3 villages whose locations are traversed by rivers where traditional gold mining or Unlicensed Gold Mining is found, namely Teratak Jering Village, Kasang Limau Sundai Village, and Rawang Oguang Village with an area of 7.80 km^2 each 2.10 km^2, and 8.00 km^2. The residents of the three villages have various occupations, namely as housewives, farmers, miners, and employees. In general, the population uses water from dug wells for daily needs such as bathing, washing, cooking and including for daily drinking water.

3.2 Multivariate Analysis Results

Multivariate analysis in this study used logistic regression test. After doing bivariate analysis on all independent variables, then the independent variable was entered into multivariate analysis with the criteria if it had a p value < 0.25 and became an important variable in this study. The independent variables that meet these criteria are as follows:

Table 1. Multivariate Analysis Results

Variable	p-value
Age	0.002
Gender	0.011
Intake Rate	1.000

Based on Table 1, it is known that the independent variables that meet the criteria for multivariate analysis can be seen based on the p-value of the bivariate test results with a p value of p ≤ 0.25. Variables that meet the criteria are age and gender variables. Furthermore, the independent variables were analyzed using multivariate logistic regression test using the enter method. The results of the analysis are presented in the following Table 2:

Table 2. Multivariate Analysis Results with Logistics Regression

No.	Variable	Coefficient (B)	Sig.	Exp(B)	95% C.I for Exp (B)	
					Lower	Upper
Step 1	Age	1.422	0.004	4.144	1.587	10.820
	Gender	-543	0.253	.581	.229	1.474
	Constant	-479	0.302	0.619		

The results show that age has effect on public health complaint around the Traditional Gold Mining, Kuantan Hilir District, Kuantan Singingi Regency, Riau Province. Gender and intake rate have no effect on public health complaint around the Traditional Gold Mining, Kuantan Hilir District, Kuantan Singingi Regency, Riau Province.

IV. Conclusion

The results show that age has effect on public health complaint around the Traditional Gold Mining, Kuantan Hilir District, Kuantan Singingi Regency, Riau Province. Gender and intake rate have no effect on public health complaint around the Traditional Gold Mining, Kuantan Hilir District, Kuantan Singingi Regency, Riau Province.

Suggestions in this research are:

1.For the Kuansing Health Office, Riau

Cooperating with relevant agencies such as the Regional Environmental Control Agency to carry out standardized monitoring of activities at gold mining sites that can pollute the environment, make policies or regulations with local governments regarding

the management of mercury use to reduce the risk of mercury-related diseases. Then carry out routine monitoring of mercury concentrations in drinking water and provide regular information about the dangers of mercury and its effects on health, so that the public knows and is aware of the dangers they face and other forms of risk management that can be taken to anticipate the emergence of risks, namely by reducing the rate of risk daily water consumption, and by reducing mercury concentrations in well water.

2. For people in gold mining to take action to prevent the impact of mercury on health by not consuming dug well water with a concentration of mercury (Hg) exceeding the threshold value (> 0.001 mg/L) or reducing the consumption of well water with a low mercury concentration because it causes accumulation in the body by replacing the consumption of refilled water or bottled water as a source of drinking water. for people who have dug wells with a distance of <100 meters from the river, they must pay attention to the structure of the well construction, such as having to use concrete rings and not digging wells that are close enough to traditional gold mining activities.

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