



OVERVIEW OF BLOOD LEAD LEVELS IN REFUELING OPERATOR WORKERS ON VETERAN STREET SURAKARTA BASED ON HEALTH COMPLAINTS

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ABSTRACT

Lead is a heavy metal that is naturally available in nature. As technology develops, many people use lead in various fields, thereby increasing the presence of lead in the environment, one of the uses of lead is in fuel. If humans are exposed to lead continuously, it will accumulate and cause health problems. One job that is vulnerable to lead exposure is fuel filling operators. The aim of this study was to measure the amount of lead in the blood of fueling operators and observe health problems that arise. Descriptive research method describes a particular observation that occurred. Researchers collect information on various events and observations to use as a starting point for analysis. Sampling used the quota sampling technique, namely determining the sample size from the population of refueling workers by looking at the specified criteria and the number of samples taken was 10 probands. Analysis of lead levels in the blood uses an atomic absorption spectrophotometer and the results in the form of lead levels in the blood are analyzed descriptively and presented in table form and narrated by looking at the results of the questionnaire that has been obtained. The results obtained were that the lowest level of lead in the blood of a gas station operator was 0.04 µg/dL and the highest lead level was 1.35 µg/dL. Description of blood lead levels of fuel operators on Jalan Veteran Surakarta do not exceed the limit, namely less than 10 µg/dL according to the Center for Disease Control and Prevention (CDC), with the most frequently felt symptom being work fatigue.

Keywords: health problems; gas station operators; lead

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INTRODUCTION

Air pollution can be interpreted as the entry of foreign materials into the air, thereby changing the composition of the air which was originally under normal conditions. If there are a lot of foreign substances in the air, it will disrupt the continuity of human life. One of the main causes of air pollution is burning fuel in motorized vehicles (BPLH DKI Jakarta, 2013). As time goes by, there is also an increase in motor vehicle users and it is so easy to buy motor vehicles, which has a negative impact on air quality because operating a motor vehicle requires fuel. The results of burning motor vehicle fuel oil, one of which is the main pollutant known as lead or tin, will spread into the air and have a negative impact on air quality, especially in urban areas. Even though lead naturally exists in the environment, its presence is very low, the additional amount of lead is mostly contributed from the exhaust gases from motor vehicles (Ardilah, 2016).

According to Windusari et al (2019), the chemical tetraethyl lead or $Pb_2(C_2H_5)_4$ is contained in fuel, where lead is a heavy metal. The presence of excessive lead content in the air has a negative impact on environmental health throughout the world, both in developed and developing countries. This was demonstrated in the research of Laila NN and Shofwati (2013). Lead can enter the body through several methods of inhalation, gastrointestinal tract and direct exposure through the skin. Lead is a toxic chemical and its presence in the body does not cause direct effects and without any specific symptoms. Lead exposure is chronic so it is less recognized so that the longer a person is exposed to lead, the cumulative dose will increase (Widiarti, 2018).

According to Laila and Iting (2013), Fajar (2022) and Nurfadillag (2019), organ systems that are continuously exposed to lead over a long period of time will cause problems in the form of disorders in several parts of the body. Refueling operators are one of the occupational professions that are vulnerable to continuous exposure to lead, these fueling operators spend approximately hours per day in the fuel station area and sometimes do not even use personal protective equipment such as masks. This further increases the potential for these workers to be directly exposed to lead from gasoline vapors and also exhaust emissions from motor vehicles carrying out filling stations or by the density of motor vehicles in the fuel filling station area. Continuous exposure over a long period of time will cause health problems for fuel operator workers.

The results of research by Rahayu and Shobayar F (201) show that 90% of exposure to lead contained in smoke or dust will be inhaled through inhalation and in adults it will be absorbed into the intestines, 5-15%. The presence of lead in the blood will increase the thiol group in the Aminolucinic Acid Dehydrae enzyme thereby disrupting heme synthesis. According to several researchers, the accumulation of lead in the body will cause health problems such as hypertension, nausea, fatigue, difficulty breathing and bleeding of the gums. Continuing from Laila and Iting (2013), health complaints that are felt have shown possible symptoms of lead poisoning such as fatigue, headaches, weakness, nausea, vomiting, tingling, ringing in the ears, memory loss, muscle cramps. Based on this, our research aims to determine the description of lead levels in fuel operator workers and the health problems they experience.

METHOD

Metode penelitian menggunakan jenis penelitian deskriptif yaitu dengan mendeskripsikan suatu pengamatan tertentu yang terjadi. Peneliti mengumpulkan informasi berbagai peristiwa dan pengamatan tersebut untuk digunakan sebagai titik awal analisis. dengan pendekatan cross sectional. Populasi penelitian ini adalah seluruh pekerja di area pengisian bahan bakar kendaraan bermotordan Teknik pengambilan sampel yaitu quota sampling peneliti menetapkan 10 sampel dari populasi yang ada dengan kriteria sampel yaitu bekerja sebagai operator SPBU lebih dari 2 tahun, umur lebih dari 25 tahun. selain pengukuran kadar timbalpenelit uga melakukan medical chek up dan guna melengkapi informasi peneliti juga menyebarkan kuesioner.

RESULTS

The following are the results of research from 10 samples of Surakarta Veteran gas station operators

Table 1.
Respondent characteristics (n=10)

Characteristics	f	%
Long Period of work		
≤ 10 Years	6	60
≥ 10 Years	4	40
Long Working Duration		
Monkeys last 8 hours per day	7	70
≥ 8 Hours Per day	3	30
Personal protective equipment		
Yes	4	40
No	6	60
Symptoms of Health Complaints		
Fatigue	8	80
Headache	2	20

Table 1 characteristics of respondents: 6 people (60%) have worked for less than or equal to 10 years, 4 people (40%) have worked for more than or equal to 10 years. Judging from working hours, 7 people (70%) work 8 hours per day, 3 people (30%) work more than 8 hours per day. Most respondents, 6 people (60%) did not use personal protective equipment and 4 respondents (40%) always used personal protective equipment.

Table 2.
Results of Lead Level Examination (n=10)

Range (in µg/dL)	f	%
0,00-0,40	7	70
0,50-0,90	2	20
1,00-1,50	1	10

Table 2 above, it shows that 70% of respondents had lead levels between 0.00-0.40 µg/dL, then 20% of respondents had lead levels between 0.50-0.90 µg/dL and 10% of respondents had lead levels between 0.00-0.40 µg/dL. lead was between 1.00-1.50 µg/dL which was the highest result compared to other respondents.

DISCUSSION

Lead examination was carried out at the Yogyakarta Health and Calibration Laboratory Center. A total of 10 respondents who were fueling operator workers at the Jalan Veteran Surakarta fueling station whose blood samples were taken had lead levels that did not exceed the normal limit. Even though the research results show that lead levels in fuel operator workers are normal, we need to be careful considering that lead in the blood has an accumulative nature and will increase with the longer a person is exposed, age and other environmental factors. This is reinforced by the statement by Laila and Iting (2013) that environmental factors, length of exposure, exposure to lead, will influence the presence of lead in the blood, especially in adults (Laila, Iting 2013).

The description of health complaints in this study as a whole showed that the most frequently complained of symptom was fatigue with 8 people (80%), and headaches with 2 people (20%). Fatigue is the most frequently complained about, this is possibly caused by the influence of exposure to lead (Pb) on the body, the load of work activities, the influence of the weather. For some people who are compliant in using PPE who experience many health complaints, this can be influenced by the length of exposure to levels of lead (Pb) as well as

other factors such as lack of knowledge about personal protective equipment, wearing masks for a long time. which are not replaced, and work uniforms which are rarely cleaned (Fajar, 2022).

Susanti and Rizky (2019) in their research revealed that worker productivity will decrease if the worker experiences fatigue, where this fatigue will also affect the health of the workers. The highest lead results in respondents had a history that the proband was one of the respondents who smoked, this is in line with the results of research by Huwaida, A.T, Raharjo M, Stiani O (2016) which concluded that smoking habits will have an impact on blood lead levels which are at risk of increasing. Siswanto (1994) suggested that it is necessary to evaluate exposure to lead to establish a diagnosis of poisoning to assess the level of danger of lead poisoning.

The impact of lead exposure will not be felt directly, because the presence of lead in the blood will accumulate so that if exposed continuously it will increase lead levels in the blood and the body will not be able to excrete it. This will affect health, including reducing several systems in the body such as disrupting the reproductive system, the liver, immunity, endocrine and gastrointestinal. Another effect of the presence of lead is that it is carcinogenic, so it causes cancer in the human body (Charkiewicz and Backstrand, 2020). Considering the dangerous impact of lead exposure in the body, it is necessary to prevent it, prevention efforts can be carried out in several ways, namely bias from environmental factors by using materials that do not contain lead. Then, workers who are continuously at risk of exposure to lead can consume nutritious food supplemented with vitamins and milk (Ismiyati, 2014).

CONCLUSIONS

Based on the results of this research, it was found that the lead in the blood of 10 fuel operator respondents was within normal limits, with the symptoms of health complaints being fatigue in 8 people (80%) and headaches in 2 people (20%).

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