

RINGKASAN

Kandungan Logam Pb pada Ikan dan Kerang serta Kaitannya dengan Kejadian GAKY pada Murid Sekolah Dasar

Arief Sofjan

Pencemaran lingkungan hampir di semua negara diakibatkan oleh beberapa faktor seperti kegiatan industri, kegiatan sarana transportasi, kegiatan domestik dan kegiatan - kegiatan manusia lainnya. Akibat dari pencemaran lingkungan selain akan merusak ekosistem juga akan memberikan dampak yang merugikan terhadap kesehatan manusia.

Salah satu bahan pencemar adalah logam berat Pb yang berasal dari limbah industri. Logam Pb tersebut akan masuk aliran sungai kemudian menuju ke laut. Dalam laut logam Pb akan masuk dalam rantai makanan biota laut sehingga ikan dan kerang mengandung Pb (proses bioakumulasi). Timbulnya endemik gondok pada daerah pantai kemungkinan disebabkan oleh “**blocking agent**” karena mengkonsumsi ikan dan kerang yang mengandung Pb (lead intoxication).

Tujuan dari penelitian ini adalah untuk mengetahui keterkaitan antara kejadian GAKY pada murid SD dengan pola konsumsi ikan dan kerang yang mengandung timbal (Pb) di daerah terpapar (Kelurahan Tambakwedi Surabaya) dan daerah pembanding (Kelurahan Paciran Lamongan).

Pengumpulan data dilakukan dengan cara mengukur kadar Pb pada ikan dan kerang. Sampel ikan dan kerang diperoleh secara langsung dari nelayan. Pengukuran kadar Pb ikan dan kerang dilakukan di Laboratorium Balai Teknik Kesehatan Lingkungan (BTKL) Surabaya. Pengambilan darah dilakukan oleh petugas dari Laboratorium Kesehatan Daerah Surabaya. Darah yang diambil adalah darah vena sebanyak 5 ml untuk setiap sampelnya dengan menggunakan syringe , kemudian dimasukkan dalam vial berisi larutan 0,1 % NH_4OH dan dikirim ke Laboratorium Kesehatan Daerah Surabaya untuk diukur kadar Pb darahnya.

Pemeriksaan kelenjar gondok dilakukan secara palpasi oleh petugas dari Dinas Kesehatan Surabaya.

Hasil pemeriksaan laboratorium didapatkan kadar Pb ikan rata-rata 0,5427 ppm (daerah studi) dan 0,000 ppm (daerah kontrol). Hasil uji-t antara terhadap Pb darah responden diketahui nilai signifikansi (p) 0,000 yang berarti ada perbedaan kadar Pb darah di daerah paparan dan pembanding ($p < 0,05$), sedangkan kadar Pb darah responden rata-rata 376,10 ppm (daerah paparan) dan 74,79 ppm (daerah pembanding). Hasil uji regresi berganda antara pola konsumsi ikan dan kerang dengan kadar Pb darah didapatkan nilai signifikansi (p) 0,029 berarti ada pengaruh pola konsumsi (kerang) terhadap kadar Pb darah ($p < 0,05$) dan dari uji regresi logistik pola makan ikan dan kerang didapatkan $p = 0,030$ berarti ada pengaruh pola konsumsi kerang terhadap Pb darah. Dari hasil pemeriksaan kelenjar gondok secara palpasi ditemukan penderita GAKY di daerah paparan (studi) yaitu grade IA sebanyak 21 anak, grade IB sebanyak 2 anak dan grade O sebanyak 7 anak sedangkan di daerah pembanding (kontrol) grade IA sebanyak 1 anak dan grade O sebanyak 29 anak. Hasil uji regresi logistik antara kadar Pb darah dan konsumsi kubis (goitrogenik) dengan kejadian GAKY didapatkan nilai signifikansi (p) 0,000 yang berarti ada pengaruh kadar Pb darah tidak normal terhadap kejadian GAKY ($p < 0,05$).

SUMMARY

Lead (Pb) Content in Fish and in Sea-Shells and its Correlation with Iodine Deficiency Disorder (IDD) found in Elementary School Students

Arief Sofjan

Almost in all countries, the environmental pollution is caused by several factors, such as activities of industries, means of transportation, domestic and other human activities. Besides destroying the eco-system, the environmental pollution also gives harmful impact to human health.

One of the pollutants deriving from the industrial wastes is the lead (Pb). This lead comes into the river flow then running down to the sea. At the sea, the aforesaid lead (Pb) enters into the food chain of sea biota, so that the fish and sea-shells will contain Pb (through bio-accumulation process). The occurrence of goiter endemic at the coastal area is possibly caused by the “**blocking agent**”, since people consume the fish and sea-shells polluted by Pb (lead intoxication).

The objective of this research is to find out the correlation between the case of IDD (Iodine Deficiency Disorder) found in Elementary School students and the consumption pattern for the fish and sea-shells containing the lead (Pb) at the exposed area (Tambakwedi Compound, Surabaya) and at the compared area (Paciran Compound, Lamongan).

Data are collected by means of measuring the Pb content in fish and in sea-shells. The samples of fish and sea-shells are directly obtained from fishermen. Measurement of Pb content in fish and in sea-shells is executed at the Laboratory for Environmental Health Technical Center, Surabaya. Meanwhile, the blood sampling is conducted by the personnel of Surabaya Regional Health Laboratory. The blood is taken from vein at the volume of 5 ml for each sample by using syringe. Then, it is put into a

vial containing 0.1% of NH_4OH solution and then sent to Surabaya Regional Health Laboratory to have its Pb content measured.

The goiter gland examination is executed by palpation by the personnel of Surabaya Regional Health Laboratory.

Outputs of the laboratory examination indicate that Pb content in fish is at the average of 0.5427 ppm (at the exposed area) and 0.000 ppm (at the compared area). Result of t-test upon Pb on the respondent's blood reveals the significant value of $(p) = 0.000$. It means there is a difference of Pb content in blood at the exposed and at the compared areas ($p < 0.05$); whereas the average Pb contents in blood are 376.10 ppm at the exposed area (study) and 74.79 ppm at the compared area (control). Outputs of simple linear regression test between the patterns of fish and sea-shell consumption with Pb content in blood indicate significant value of $(p) = 0.0029$. This means that there is an correlation between the consumption pattern (sea-shell) and the Pb content in blood ($p < 0,05$).

On the goiter gland examination by palpation, it is found out that the patients suffering from Iodine Deficiency Disorder (IDD) at the exposed area (study) are at the sum of 21 kids of grade IA, 2 of grade IB and 7 of grade O. Meanwhile, the patients at the compared area (control) are as follows: 1 kid of grade IA and 29 of grade O. The output of logistic regression tests between Pb content in blood and cabbage consumption (goitrogens) having the Iodine Deficiency Disorder (IDD) reveal the significant value $(p) = 0.0000$. This means that there is a correlation between the abnormal Pb content in blood and the IDD Case ($p < 0.05$).



ABSTRACT**Lead (Pb) Content in Fish and in Sea-Shells and its
Correlation with Iodine Deficiency Disorder (IDD)
found in Elementary School Students****Arief Sofjan**

Almost all of environmental pollution is basically caused by activities of means of transportation, industrial, domestic and other human activities. Besides destroying the eco-system, the environmental pollution also gives harmful impact to human health. One of the pollutants deriving from the industrial wastes is the lead (Pb). This lead comes into the river flow running down to the sea. At the sea, the aforesaid lead (Pb) enters into the food chain of sea biota, so that the fish and sea-shells will contain Pb (through bio-accumulation process). The increase of goiter endemic at the coastal area is possibly caused by the “**blocking agent**”, since people consume the fish and sea-shells polluted by Pb (lead intoxication).

From the outputs of research in Tambakwedi Compound, Surabaya (exposed) and in Paciran Compound, Lamongan (compared), it is found out that Pb content in fish is at the average of 0.5427 ppm (exposed) and 0.000 ppm (compared). Result of t-test upon Pb on the respondent's blood reveals the significant value of $(p) = 0.000$. It means there is a difference of Pb content in blood at the exposed and at the compared areas ($p < 0.05$); whereas the average Pb contents in blood are 376.10 ppm at the exposed area (study) and 74.79 ppm at the compared area (control).

Outputs of simple linear regression test between the patterns of fish consumption and sea-shell consumption with Pb content in blood indicate significant value of $(p) = 0.0029$. This means that there is an correlation between the consumption pattern (sea-shell) and the Pb content in blood ($p < 0.05$).

On the goiter gland examination by palpation, it is found out that the patients suffering from Iodine Deficiency Disorder (IDD) at the exposed area (study) are at the sum of 21 kids of grade IA, 2 children of grade IB and 7 of grade O. Meanwhile, the patients at the compared area (control) are as follows: 1 kid of grade IA and 29 of grade O. The output of logistic regression tests between Pb content in blood and cabbage consumption (goitrogenics) having the Iodine Deficiency Disorder (IDD) reveal the significant value (p) = 0.0000. This means that there is a correlation between the abnormal Pb content in blood and the IDD Case ($p < 0.05$).

Key-words:

IDD = Iodine Deficiency Disorder, leads (Pb) content, blocking agent, environmental pollution, eco-system.

