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### Correlation of Lead Poisoning and Intelligence Status of School Children in a Southern Nigerian Urban City

*Corrélation Entre l'Empoisonnement au Plomb et le Statut des Enfants Scolarisés dans une Ville Urbaine du Sud du Nigéria*

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#### ABSTRACT

**BACKGROUND:** Lead is a heavy metal of utmost public health significance in Nigeria. It is a known neurotoxin that impairs neurotransmission and brain function resulting in cognitive and motor deficits. Ingestion of lead contaminated food or water is the major route of exposure to lead manifesting as neurologic symptoms which can interfere with the intelligence of school children.

**AIM:** To correlate the Intelligence quotient scores with the blood lead levels of primary school children in Southern Nigeria.

**METHODS:** The study was a descriptive cross-sectional study amongst primary school pupils, conducted in Asaba, the capital of Delta state, Nigeria. Goodenough-Harris "Draw a Person Test" validated by Ebigbo and Izuora in Enugu, Nigeria was used to assess the intelligence of the pupils while blood lead levels was measured with Flame Atomic Absorption Spectrophotometer (FAAS).

**RESULTS:** Three hundred and twenty subjects were recruited. **Seventy-one** subjects did not have lead poisoning (22%) while two hundred and forty-nine subjects had lead poisoning (77.8%). Mild, moderate and severe level lead poisoning constituted 22.5% (56/249), 28.1% (70/249) and 49.4% (123/249) respectively. Seventy percent (225) subjects had optimal IQ while 95 subjects had sub-optimal IQ and mean IQ score was  $92.9 \pm 25.1$ . There was no association and correlation between IQ status and levels of lead poisoning.

**CONCLUSION:** A significant proportion of school children had optimal level of intelligence despite the high prevalence of lead poisoning seen among them. There was no association or correlation between different levels of childhood lead poisoning and Intelligence quotient status. **WAJM 2022; 39(3): 275–280.**

**Keywords:** Lead poisoning, intelligence, childhood.

#### RÉSUMÉ

**CONTEXTE:** Le plomb est un métal lourd de la plus haute importance pour la santé publique au Nigeria. C'est une neurotoxine connue qui altère la neurotransmission et la fonction cérébrale entraînant des déficits cognitifs et moteurs. Ingestion de plomb contaminé la nourriture ou l'eau est la principale voie d'exposition au plomb qui se manifeste comme symptômes neurologiques, ce qui interfère avec l'intelligence des écoliers.

**OBJECTIF:** Corréler les scores du quotient intellectuel avec les taux de plomb dans le sang des enfants des écoles primaires dans le sud du Nigéria.

**MÉTHODES:** L'étude était une étude transversale descriptive parmi les élèves de l'école primaire, menée à Asaba, la capitale de l'État du Delta, Nigéria. Goodenough-Harris « Dessinez une personne Test » validé par Ebigbo et Izuora à Enugu, Nigeria a été utilisé pour évaluer l'intelligence des pupilles pendant que le sang mène les niveaux ont été mesurés avec l'absorption atomique de flamme Spectrophotomètre (FAAS).

**RÉSULTATS:** Trois cent vingt sujets ont été recrutés. Soixante et onze sujets n'avaient pas d'empoisonnement au plomb (22 %) alors que deux cent quarante-neuf sujets avaient une intoxication au plomb (77.8%). Intoxication au plomb légère, modérée et sévère constituaient 22,5 % (56/249), 28,1 % (70/249) et 49,4 % (123/249) respectivement. Soixante-dix pour cent (225) sujets avaient un QI optimal tandis que 95 sujets avaient un QI sous-optimal et le score de QI moyen était  $92,9 \pm 25,1$ . Il n'y avait pas d'association et de corrélation entre État du QI et niveaux d'empoisonnement au plomb.

**CONCLUSION :** Une proportion importante d'écolier avaient un niveau d'intelligence optimal malgré la forte prévalence de empoisonnement au plomb vu parmi eux. Il n'y avait pas d'association ou corrélation entre les différents niveaux de plomb infantile empoisonnement et statut du quotient intellectuel. **WAJM 2022; 39(3): 275–280.**

**Mots-clés:** Empoisonnement au plomb, intelligence, enfance.

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**Abbreviations:** BLL, Blood Lead Levels; CDC, Center for Disease Control and Prevention; DAPP, Draw a Person Point; DAPQ, Draw a Person Quotient; DMT, Divalent Cation Metal Co-Transporter; DPT, Draw a Person Test; IQ, Intelligence Quotient; LGA, Local Government Area; NMDA, N-methyl-D-aspartic Acid.