

Original Article

Relationship between blood lead (Pb) concentration with risk of diabetes mellitus in women living in mining area

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Abstract

Diabetes is a global health concern with significant implications for individuals and societies. Diabetes results from a complex interaction between genes and environmental factors, including metal exposure. Lead or plumbum (Pb) is a heavy metal pollutant and is predicted to be associated with the morbidity of diabetes. The aim of this study was to assess the relationship between blood Pb level and possible risk factors (body mass index, insulin resistance, carbohydrate intake, sugar intake, and physical activity) with fasting blood sugar (FBS) level in women living in the mining area. A cross-sectional study was conducted in a mining area of Indonesia located in Pemali District, Bangkajene Kepulauan Regency, involving women aged 30–49, selected through purposive sampling. Logistic regression was used to assess the relationship between the risk factors and FBS level, while the Spearman correlation was used to analyze the correlations between the risk factors and FBS level. Our data indicated that blood Pb concentration and other risk factors (carbohydrate intake, sugar intake and physical activity) were neither associated nor correlated with FBS level. However, as predicted, insulin resistance was associated with FBS level with OR: 0.66; 95%CI: 1.13–82.29; $p=0.038$. In addition, the Homeostatic Model Assessment Insulin Resistance (HOMA-IR) score was also correlated with FBS level ($r=0.316$, $p=0.002$). This study highlights the level of Pb is not associated with the risk of diabetes in women living in mining area.

Keywords: Blood Pb concentration, diabetes mellitus, fasting blood sugar, insulin resistance, mining area

Introduction

Diabetes is a metabolic disorder identified by insufficient insulin production by the pancreas or ineffective insulin utilization by the body, impacting blood sugar regulation [1]. Diabetes, a chronic and severe disease, has a profound impact on the life and health of individuals and communities worldwide. The International Diabetes Federation estimated the worldwide cost of treating adult diabetes in 2017 was USD 850 billion [2]. The global diabetic population is projected to reach 629 million by 2045, with nearly 4 million deaths attributed to high blood glucose [3]. Indonesian Basic Health Research 2013–2018 revealed an increase in diabetes prevalence among individuals aged 15 years and above, from 1.5% to 2% [4,5].



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