

Title: Health effects of heavy metals in meat and poultry consumption in Noakhali, Bangladesh

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Abstract: This study examined the quantities of heavy metals (Cd, Cr, Pb, Ni, Fe, and Cu) in commercially available meat, poultry, and game products in Noakhali, Bangladesh, and their potential health effects, as heavy metal contamination poses a significant food safety risk to human health. Atomic Absorption Spectrophotometry was used to analyze heavy metals, and the health risk assessment was based on Estimated Daily Intake (EDI), Targeted Hazard Quotient (THQ), Total THQ, and Total Carcinogenic Risk (TCR). Most samples exceeded Maximum Allowable Concentrations (MAC) for heavy metals. The EDI value of Cd, Pb, and Cr for duck liver, goat liver, and pigeon brain, were higher than the Maximum Tolerable Dietary Intake (MTDI). Children had 1.28 times higher HI values than an adult. The calculation of THQ of all elements in adults and children was in the order of Cu; Pb; Ni; Cr; Cd; and Fe. The calculated TTHQ values were in the range of 0.051 to 1.988 and 0.047 to 3.975 for adults and children, respectively. The TCR values for Cd in poultry liver, brain, and meat, Sonali chicken, cow, pigeon, duck, and goat liver were higher than the reference value for adults and children, suggesting a potential cancer risk. The average exposure to lead leads to an increase in blood pressure by 0.47 mmHg and a decrease in IQ score by 1.94 points. The present study reveals the need to determine strong relationships between heavy metal exposure and food supply.

Keywords: Atomic Absorption Spectrophotometry; Food safety; Health Risk Assessment; Heavy metals; Meat; Poultry.

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