Scalp Hair Mercury Concentrations in Pakistan

Muhammad Anwar*, Tetsuo Ando, Ahmad Maaz¹, Sidra Ghani³, Muhammad Munir², Ihtesham-ud-din Qureshi², Samina Naeem², Mayumi Tsuji, Junji Wakamiya⁴, Atsuhiro Nakano⁵ and Suminori Akiba

Department of Epidemiology and Preventive Medicine, Kagoshima University Graduate School of Medical and Dental Sciences, 8-35-1 Sakuragaoka, Kagoshima 890-8544, Japan
¹Department of Community Medicine and ²Department of Pathology, King Edward Medical University, Lahore, Pakistan
³Department of Chemistry, University of Engineering and Technology, Lahore, Pakistan
⁴Department of Basic Medical Sciences and ⁵Department of Clinical Medicine, National Institute for Minamata Disease, 4058-18 Hama, Minamata, Kumamoto 867-0008, Japan

*(Received October 18, 2006; accepted February 6, 2007)

E-mail: manwar@m3.kufm.kagoshima-u.ac.jp

Key words: mercury, selenium, hair, toenail, fish consumption, Pakistan

The presence of mercury in the environment is widespread and persistent, but the extent of exposure of Pakistanis to mercury is virtually unknown. We collected toenail and scalp hair samples from 158 subjects (83 males and 75 females) residing in Lahore and its suburbs. We also conducted a questionnaire survey and personal interviews to obtain information on demographic factors, lifestyles, and socioeconomic factors, among others. Mercury concentration in hair samples was measured by cold vapor atomic absorption spectrometry (CV AAS). In addition, the concentration of selenium in the toenail and hair samples was determined by inductively coupled plasma mass spectrometry (ICP-MS). The mean hair mercury concentration was 0.45 ppm (95% CI=0.34–0.60) and did not show correlation with fish consumption, age, area of origin, or present residence. Mercury concentration was higher (p=0.021) in females than in males, and was also higher in subjects with 11 or more years of education (p for trend=0.013). There were 13 subjects with mercury concentration higher than 10 ppm. Most of them were young females and a few were middle-aged males. When the analysis was confined to subjects with mercury concentrations lower than 0.6 ppm, the amount of fish consumed showed correlation with hair mercury concentration with a marginal statistical significance (p=0.065). The geometric means of selenium in hair and toenails were 0.87 and 1.01 ppm, respectively. Mercury and selenium concentrations in hair showed no correlation (correlation coefficient=0.057, p=0.478). This study shows that mercury exposure levels among residents in Lahore and its suburban areas are relatively low, except among outliers, wherein mercury exposure might be brought about by the use of mercury-containing soaps.