

Adverse Human Health Outcomes among People Living Near Highly Polluted Waste Water Drains in Punjab, India

Thakur JS (1), Singh D (2), Prinja S (1), Rajwanshi A (3), Arora S (4), Parwana HK (5), Kumar R (1). 1. School of Public Health; 2. Department of Forensic Medicine; 3. Department of Cytology and Gynecological Pathology; 4. Department of Immunopathology, Post Graduate Institute of Medical Education and Research, Chandigarh, India; 5. Punjab Pollution Control Board, Patiala, India

Background : Depleting water resources, industrialization and rampant use of pesticides and fertilizers in agriculture has led to pollution of water bodies in Punjab. This is associated by acute and chronic morbidities among humans. **Objectives :** To ascertain the pattern and extent of water pollution and determine association if any between exposure to water pollution and adverse human health. **Methods :** A cross sectional survey was done among 5567 and 2289 persons selected in reference and control area to determine prevalence of systemic and general health morbidities. Effluent, ground and surface water samples along with fodder, vegetable, milk (bovine and human), blood and urine samples were tested to ascertain influence of heavy metal and pesticide pollution of water bodies. **Results :** Gastrointestinal, water- related, eye, skin and bone diseases were significantly associated among reference area population ($p < 0.05$). Higher prevalence of micronuclei was observed among reference area population while 40% and 10% reference area population was detected as moderate and highly mutated respectively. Mercury, lead, chromium, cadmium and selenium were found in more than permissible limits in ground and surface water. Chlorpyrifos, β -endosulphan, dimethoate, heptachlor and α -endosulphan were found in samples of effluent and ground water with concentrations exceeding MPL. Heavy metals and pesticides were also detectable in fodder, vegetable, milk, urine and blood samples. **Conclusion :** Thus the present study brings to light evidence of significantly higher systemic and general health morbidities along with manifestations of genotoxic effect of a cocktail of heavy metal and pesticide contamination of waste water which has infected the ground and surface water. Stringent monitoring of water quality of drains, industry and municipal bodies for organic and inorganic pollution is required. Further studies for identification of DNA adducts are needed to identify the specific heavy metals and pesticides involved in genotoxicity.