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Review article:

A REVIEW OF ENVIRONMENTAL AND OCCUPATIONAL EXPOSURE TO XYLENE AND ITS HEALTH CONCERNS

Kamal Niaz[1], Haji Bahadar[1], Faheem Maqbool[1], Mohammad Abdollahi[1,2,*]

[1] Pharmaceutical Sciences Research Center, Tehran University of Medical Sciences, International Campus, Tehran, Iran
[2] Department of Toxicology and Pharmacology, Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran 1417614411, Iran

* Corresponding author: Mohammad Abdollahi**,** Department of Toxicology and Pharmacology, Faculty of Pharmacy and Pharmaceutical Sciences Research Center, Tehran University of Medical Sciences, Tehran 1417614411, Iran. Tel/Fax: +98-21-66959104;
E-mail: Mohammad.Abdollahi@utoronto.ca; Mohammad@tums.ac.ir

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ABSTRACT

Xylene is a cyclic hydrocarbon, and an environmental pollutant. It is also used in dyes, paints, polishes, medical technology and different industries as a solvent. Xylene easily vaporizes and divides by sunlight into other harmless chemicals. The aim of the present review is to collect the evidence of the xylene toxicity, related to non-cancerous health hazards, as well as to provide possible effective measurement to minimize its risk ratio. For current study a bibliographic search of more than 250 peer-reviewed papers in scientific data including PubMed, and Google Scholar about xylene was done. But approximately 130 peer-reviewed papers relevant to xylene were included (Figure 1). All scientific data was reviewed with key words of “xylene toxicity”, “xylene toxic health effects”, “environmental volatile organic compounds”, “human exposure to xylene”, “xylene poisoning in laboratory workers”, “effects of xylene along with other hydrocarbons”, “neurotoxicity of selected hydrocarbons”, and “toxic effects of particular xylene isomers in animals”. According to these studies, xylene is released into the atmosphere as fugitive emissions from petrochemical industries, fire, cigarette, from different vehicles. Short term exposure to mixed xylene or their individual isomers result in irritation of the nose, eyes and throat subsequently leading toward neurological, gastrointestinal and reproductive harmful effects. In addition long term exposure to xylene may cause hazardous effects on respiratory system, central nervous system, cardiovascular system, and renal system. The health concerns of xylene are well documented in animals and human. It is important to improve health policies, launch xylene related health and toxicity awareness campaigns, to get rid of its dangerous outcomes. Chronic diseases have become a threat to human globally, with special prominence in regions, where xylene is used with other chemicals (benzene, toluene etc.) especially in petroleum and rubber industry. The mechanism of toxicity and interactions with endocrine system should be followed up which is the main threat to human health.

Keywords: xylene, health hazards of xylene, genotoxicity, hepatotoxicity, neurotoxicity, review

Abbreviations: TWA = time-weighted average; p = para; m = meta; o = ortho; Bd wt = body weight; d =day (s); DNA = deoxy ribonucleic acid; CYP = cytochrome P; GABA = gamma-aminobutyric acid; Gd = gestational day; SGPT = serum glutamic pyruvic transaminase; x = time (s); mo = month (s); yr = year (s); mg = milligram; kg = kilogram; CNS = central nervous system; GIT = gastrointestinal tract; RER; rough endoplasmic reticulum, RBC = red blood cells; WBC = white blood cells, ppbv = parts per billion volume, EPA = Environmental Protection Agency, NPL = National Priorities List, VOC = volatile organic compound, MDA = malondialdehyde, SOD = superoxide dismutase, GSH-Px = glutathione peroxidase, VOCs = volatile organic compounds