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ABSTRACT

Title of Abstract : Systematic Review: Analysis of the Relationship Between Benzene Exposure and the Incidence of Anemia Among Workers
Authors of Abstract : Ayudhia Rachmawati¹, Danang Wahansa Sugiarto²
Affiliation : FKM UNMUL
Correspondence E-mail : rachmawatiayudhia@fkm.unmul.ac.id

Background : Benzene is a volatile organic compound widely used in industrial sectors such as petrochemicals, paints, solvents, and the manufacture of rubber and plastics. Continuous exposure to benzene vapor in occupational settings can disrupt the hematopoietic system, leading to anemia.

Objective : This review was systematically conducted to examine the relationship between benzene exposure and the incidence of anemia among industrial workers.

Research Methods/ Implementation Methods : The method followed the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Literature sources were obtained from three databases: PubMed, Wiley Online Library, and Science Direct, with publication years limited to 2020–2025. Included articles were English-language, full-text publications that reported observational or experimental studies assessing the hematopoietic effects of benzene leading to anemia.

Results : The search yielded three studies meeting the inclusion criteria, all conducted in China and Iran. The main findings indicated that low-level benzene exposure (<1 ppm) significantly reduced erythrocyte and leukocyte counts. Additionally, genetic variations in the ATM and H2AX genes were associated with increased susceptibility to hematological abnormalities among individuals exposed to BTEX (benzene, toluene, ethylbenzene, xylene). Elevated expression of microRNA Let-7e-5p was suggested to play a role in disrupting apoptosis and cell proliferation in bone marrow, contributing to hematopoietic dysfunction.

Conclusion/Lesson Learned : Overall, the reviewed evidence demonstrates that benzene's hematotoxic effects can occur even at very low exposure levels. These findings highlight the importance of workplace environmental monitoring, consistent use of personal protective equipment, and routine blood examinations to enable early detection of anemia resulting from chronic benzene exposure.

Keyword : Benzene; Anemia; Workers; Hematotoxicity.