



Phthalates Exposure and Associated Diseases: A Systematic Review of Human Epidemiological Evidences



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Theme: Environmental Toxicants

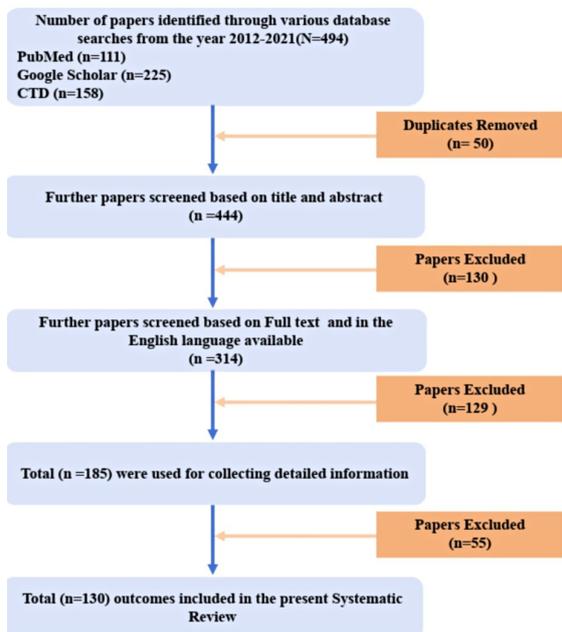
Background

- Phthalates are endocrine disrupting chemicals (EDCs) and are suspected to alter the endocrine function of endogenous hormones.
- They are ubiquitous in the environment and humans are exposed to them via their diet, air and daily products.
- Several studies reported that phthalate exposure may affect the genes involved in neurodevelopmental behavior, sex development and fertility, asthma and allergies, thyroid function, diabetes and obesity.
- Here, we performed a systematic review of the epidemiological studies to find out the association of phthalates exposure and its health effects.

Methodology

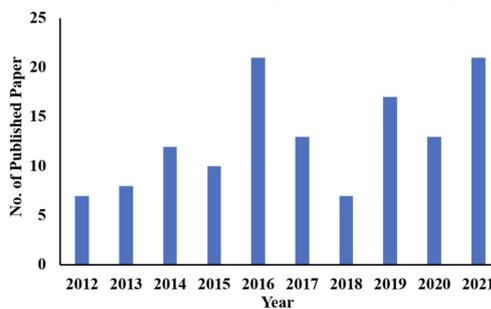
- Initial search was performed using three databases- Google Scholar, Comparative Toxicogenomic Database (CTD) and PubMed.
- Keywords used- phthalates and development, phthalates and metabolic disorders

Literature review flow diagram for phthalates exposure and their associated effects

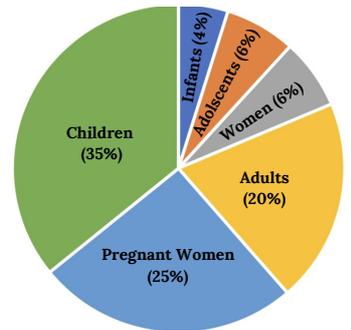


Results

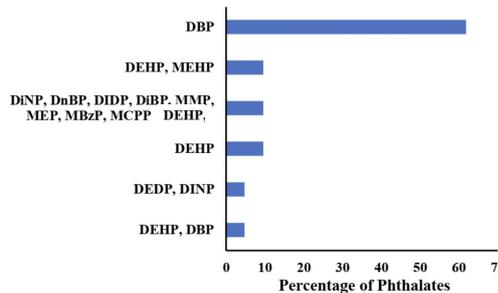
Number of studies reported in last 10 years



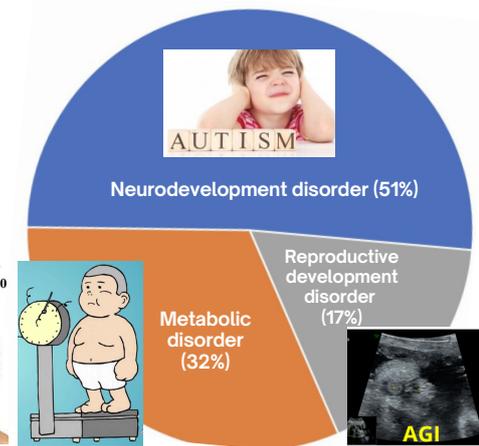
Studies reported in various subjects



Different phthalates reported in Children



Effects of phthalates reported in Children



Results

- We reviewed a total of 130 human epidemiological studies to find out the phthalates exposure and their associated effects.
- Maximum number of total selected studies were reported in the years 2016 and 2021
- Most of the phthalate exposure studies were reported in Children (35%) followed by Pregnant Women (25%) and Adults (20%).
- We further focused on studies related to children and found that DBP is the most reported phthalate in urine sample.
- Effects of phthalates in children were reported as Neurodevelopment (51%), being the highest, of which 35% were related to Autism Spectrum Disorder (ASD) and 15% to Attention Deficit Hyperactivity Disorder (ADHD).
- A total of 32% studies in children were associated with metabolic disorders, obesity being the highest followed by disturbed thyroid gland function.
- Around 17% studies were related to reproductive development disorders like anogenital distance anomalies or early menarche
- The reasons for these occurrences in children could be possible exposure via ingestion, inhalation and dermal absorption from phthalate sources.

Conclusion

- Systemic review analysis revealed that phthalate exposure associated with several type of neurodevelopment disorders, metabolic disorders and reproductive behaviour among children.
- Although there can be several possible reasons associated with phthalate exposure and its affected diseases, there is not a clear pattern of association between type of phthalates mixture and affected diseases.
- More large-scale epidemiological studies are needed to clarify their association, reducing the phthalate exposure in children is necessary to prevent unexpected consequences of reproductive and neurodevelopment effects in our offspring.

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References • <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7537731>
• <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8632231/>
• <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8036555/>