

Life is Plastic, and It is Not Fantastic

Akhil Allakky*

General Practitioner, Hyderabad, India

Citation: Akhil Allakky. *Life is Plastic, and It is Not Fantastic*. *Int Clin Med Case Rep Jour*. 2023;2(5):1-3.

Received Date: 03 February, 2023; **Accepted Date:** 06 February, 2023; **Published Date:** 08 February, 2023

***Corresponding author:** Akhil Allakky. General Practitioner, Hyderabad, India

Copyright: © Akhil Allakky, Open Access 2023. This article, published in *Int Clin Med Case Rep Jour (ICMCRJ)* (Attribution 4.0 International), as described by <http://creativecommons.org/licenses/by/4.0/>.

ABSTRACT

Objective: To further shed light on the effects of plastic and its components on our health and environment.

Methods: Tertiary data from previously published literature pertaining to our topic of interest was used and analyzed for this research article. Five such published papers were selected from international journals and relevant information was studied and extracted.

Results: Plastic and its ubiquitous form known as microplastic has been deemed to be harmful not only to the environment but also to human health as it inevitably enters the food chain and becomes a part of our dietary consumption. Drinking water bottles alone contributed to the consumption of over 90000 particles of microplastics in the average American. Plastic was also found in the placenta of pregnant mothers which has been discovered to hamper the cell-signalling pathway and cause fetal growth defects and preeclampsia. A compound of plastic known as phthalates was also found to be associated with the development of childhood asthma. Microplastics have also been observed to trigger the release of hepatic inflammatory markers in mice that lead to fibrosis.

Conclusion: Although research on the effects of microplastics and their effects is limited it holds significance as plastic has become an imperative part of our daily lives. It may be a distant vision to have a plastic-free world but it is not impossible. It may be recommended that plastic usage especially that is non-biodegradable be banned and its usage be limited especially to pregnant mothers and children.

Keywords: Plasti; Microplastic; Carcinogenic; Pregnancy; Environment; Cytotoxicity

For the past decade, we have been reading about plastic polluting the seas and oceans, and damaging landfills and the ecosystem. Katsanevakis, stated that marine debris is a growing problem that continues to leave damning effects.

[1] Plastic causes serious fatal effects on the lives of these marine creatures; animals get entangled, choked, and get lacerations. When plastic enters the animal food chain, it inevitably ends in the human food chain, thus leading to us humans consuming the same plastic we throw away.

Another ubiquitous form of plastic known as microplastic is now being discovered inside the human system and in animals. Microplastics are plastic particles up to 5mm in size while the lower limit remains undefined. In a study published in 2019 by Kieran D Cox and others, it was found that an average American ingests about 39000 to 52000 microplastic particles annually and this number is nearly doubled to 74000-121000 when inhalation is also

accounted for.^[2] Consumption of drinking water through plastic bottles led to an estimated 90000 microplastic particles per year.

Researchers in Italy have recently found microplastics in the human placenta.^[3] It was stated that microplastics may alter several cell signalling pathways, and hinder the endogenous immune system mechanisms such as growth factor signalling, and trafficking of NK cells, chemokines, and T-cells. The researchers have concluded that it is a matter of great concern as it may adversely affect the outcomes of pregnancy by leading to foetal growth restriction and preeclampsia. Even neonates aren't free from being exposed to microplastic; a study in Ireland concluded that infant feeding bottles used to prepare formula milk release microplastic during feeding and sterilisation in hot water.^[4] They estimated the average infant consumption of microplastics by infants is about 1580000 daily!

The latest study conducted in March 2022 in the Netherlands discovered microplastics in human blood from healthy donors.^[5] 17/22 samples were found to contain microplastic particles. Nearly half of the samples contained plastic type 1 which is used in making plastic bottles and packs we use daily. A little over a third of the samples showed polystyrene used in food packaging and about 25% had polyethylene used in making carry bags. The number at present seems minuscule, but the long-term effects of plastic on human health are alarming. Gabriella F.Schirinzi and colleagues in 2017 found out that microplastics can lead to cytotoxicity by causing oxidative stress on cerebral and human epithelial cells.^[6] Moreover, the industrial raw materials used in the manufacturing of plastic are lethal and often fatal to life. Compounds such as Polychlorinated biphenyl (PCB) and Polybrominated biphenyl (PBB) are known to be highly carcinogenic, although their use has been banned in most countries, it is still widely used and continues to pollute the environment.

A 2022 European study reported that a covalently bound chemical compound known as phthalates is commonly used during the manufacturing of plastics.^[7] This compound is a plasticizer, i.e., used to increase the flexibility of plastics. As they are covalently bound, they are easily released into the environment and it has been reported in this study that they have been found in household dust, urine, and breast milk. Researchers have also stated that there may be an association between phthalates exposure and childhood asthma.

Another recent study in 2022 by Horvatits T et.al, reported that there is an association between microplastics' exposure leading to an increase in the development of inflammatory markers in the liver, such as transforming growth factor- β and, fibronectin, and α -smooth muscle actin in rats.^[8] The study findings reported microplastic concentrations to be in the range of 4.6 to 11.9 particles per g of tissue in those with liver cirrhosis, and 0.3 to 1.9 particles per g of tissue in patients without any underlying hepatic disease. This begets the question of whether the accumulation of microplastics in the liver predisposes to fibrosis or if it occurs as a consequence of portal hypertension and cirrhosis.

Although the research on the health effects is limited, it is reasonable to be concerned. Further studies are certainly needed to evaluate the association of microplastics and their compounds and forms with diseases of the liver, gut, and lung and developmental health. It may seem like a utopian dream to live in a plastic-free world, but it is certainly the need of the hour for us to act to save ourselves. Help yourself, help the planet.

REFERENCES

1. KATSANEVAKIS S. Illegal immigration in the eastern Aegean Sea: a new source of marine litter. Mediterranean Marine Science 2015;16(3):605.
2. Cox KD, Covernton GA, Davies HL, Dower JF, Juanes F, et al. Human Consumption of Microplastics. Environmental Science & Technology 2019;53(12):7068-7074.
3. Ragusa A, Svelato A, Santacroce C, et al. Plasticenta: First evidence of microplastics in human placenta. Environment International 2021;146.
4. Li D, Shi Y, Yang L, et al. Microplastic release from the degradation of polypropylene feeding bottles during infant formula preparation. Nature Food 2020.
5. Leslie HA, J. M. van Velzen M, Brandsma SH, Vethaak D, Garcia-Vallejo JJ, Lamoree MH. Discovery and quantification of plastic particle pollution in human blood. Environment International 2022;163:107199.
6. Schirinzi GF, Pérez-Pomeda I, Sanchís J, Rossini C, Farré M, Barceló D. Cytotoxic effects of commonly used nanomaterials and microplastics on cerebral and epithelial human cells. Environmental Research 2017;159:579-587.
7. Blackburn K, Green D. The potential effects of microplastics on human health: What is known and what is unknown. Ambio 2022;51(3):518-530.
8. Horvatits T, Tamminga M, Liu B, et al. Microplastics detected in cirrhotic liver tissue. EBioMedicine. 2022;82:104147.