Does reusable mean less environmental impact? A systematic review of the environmental impacts of medical plastics, challenges, and gaps

Abstract

The application of medical plastics, such as disposable medical plastics, is increasing and causing different environmental and public health challenges during disposal. The individual and collective environmental impact of these plastics is rarely investigated. This review aims to summarize the environmental impacts of selected medical plastics in the healthcare systems using Life Cycle Assessment (LCA) at different life cycle stages. Five databases, PubMed, MEDLINE, Google Scholar, Science Direct, and CINAHL, were used for the search. The environmental impact of 46 plastic products was summarized at different life cycle stages. The environmental impact for a total of 46 single-use and 17 reusable medical products was assessed at the individual level and using a given functional unit. A wide variation of carbon footprint was observed among the single-use items (0.013-109 kg CO2 eq.) A single-use operation room bed cover and surgical mask recorded the highest and the lowest values respectively. Similarly, for reusable medical products, the range was 0-19.8 kg CO2 eq., with the reusable operation room bed covers recorded as the highest and a multi-use blade recorded as having the lowest carbon footprint. In the hotspot analysis, production and sterilization were the main contributors to the carbon footprint of single and reusable medical plastics. This comprehensive review could be used as evidence during procurement and environmental impact assessment at a health facility or national level. It can also be used as input for policymakers in future planning or during revising existing policy documents.