

# Reduction in Plastic Use Essential for Global Health

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## Abstract

### Context

Environment /climate change are burning issues globally. Single use plastic (SUP) in health care is big contributor. Nature of material used affects properties of plastic products. Excessive use, negligence in disposal, have resulted in massive pollution of environment, harming everything on earth, soil pollution, water pollution, air pollution affecting crop, vegetables, fruits, everything, every life, wasting valuable resources, serious problems, need rethinking of all aspects. SUP seems virtually unavoidable in everyday use. Although reducing SUP is crucial, there is little evidence of achieving this in everyday practice. Challenge is also in using opportunities of converting plastic waste for industrial use. Scale of growth of plastic products in healthcare is alarming. Growth of SUP devices is largely driven by concerns of infection from contaminated medical equipments, convenience. Proportion of medical plastic disposed by different means vary with resources of health units, regions, countries, knowledge attitude of health teams. Over all plastic waste management depends on socio-economic inputs, community involvement also. Plastic pollution is global concern that must be addressed collectively with utmost urgency by global community. Management of plastic waste is challenging problem for researchers, policymakers, other stakeholders, citizens. Patients may be willing to compromise reusable material for better environment, climate. Substantial evidence exists for reduction of plastic pollution from various ecosystems, empowering, educating communities, and citizens. Health care providers need to act collectively to minimize plastic pollution, use alternative options which must be promoted enforced. U turn is essential with some stars of new knowledge, technology.

**Keywords:** Plastic, Pollution, Climate Change, Impact, Health Effects, Recycling

## 1. Introduction

The scale and growth of plastic use in healthcare is alarming. As an increasing variety of plastics have been developed over the past 150 years, there has been exploitation at various levels of healthcare applications, different settings in countries around the world [1]. The growth of single-use devices (SUP) is largely driven by concerns of infection by some of the contaminated medical equipments, convenience and many other reasons, which are complex. Plastic use has become a critical issue that threatens the planet's well-being. For 2023 theme for World 'environment day' served as a powerful call for action, urging individuals, communities, and governments to work together to combat the pervasive problem of plastic waste [2]. The management of plastic waste is a challenging problem for researchers, policymakers, program managers, service, providers other stakeholders and citizens. Plastic waste management in different countries varies and community involvement depends on health systems socio-economic inputs.

Pollution is increasing at alarming levels, causing damage to ecosystems and human health, difficult to repair.

## 2. Methodology

Research, reviews and opinions were looked into and self-experiences and observations were added

## 3. Findings

Plastic is ubiquitous in practice. Plastic pollution not only threatens the environment, present health but that of future generations also by pollution around the globe. Material for plastic items, manufacturing production, use, disposal and recycling, are negatively affecting people and the environment at each stage of lifecycle. The impact is felt in a wide range of areas, biodiversity, climate change, human health and everything on earth [3]. Humans are exposed to a large variety of toxic chemicals and microplastics through inhalation, ingestion by various modes in water and direct skin, eye contact, all along the plastic lifecycle. SUP based on fossil fuels is particularly problematic, as it seems virtually unavoidable in everyday life from water bottles to boxes used for various items. Although reducing SUP is crucial, there is little evidence of achieving this in everyday practice [4]. Decades back a lot of metal, glass items were used in health care but have been set aside with valid reasons, infection, breakage of glass items, increasing

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cost of health care, many other issues, but items with which replacement has been done are still worst. While reliance on SUP rather than reusable medical products to a large extent continues to stem from concerns of infection, in many cases, the risk of infection is hypothetical or infinitesimal and poorly evidenced.

Rizan suggested that the risk of infection from reprocessing and reuse of an intravenous cannula may be unacceptably high but the risk of infection from reuse of suction tubing used to clean ear wax seems negligible; yet, in some healthcare facilities, both items are classified as SUP [1]. Reuse rather than disposal of a device is often, but not always, the better option for reducing environmental harm. Quantification of this harm can be through life cycle assessment, an approach that takes into account all stages of a product's life, production, sterilisation, maintenance, use and disposal. Proshad et al opined that plastic items may be seen essential in modern civilization, but many plastic products manufactured promote risk to human health and the environment with different human health problems like irritation in the eyes, vision failure, breathing difficulties, respiratory problems, liver dysfunction, cancers, skin diseases, lung problems, headache, dizziness, birth defects, reproductive, cardiovascular, genotoxic, gastrointestinal disorders and so on. Rabiou et al did a study about reducing SUP in everyday practice and reported that findings revealed that everyday practice shaped SUP use, and reduction disrupts daily life, even for eco-conscious consumers [4,5]. Packaging-free shops are a popular approach in reducing SUP. However, consumers are hindered from using this alternative by limited availability, convenience and product variety. Future research should explore the seamless integration of alternatives to reduce SUP into everyday practices. Lange opined that irresponsible disposal of used plastic has led to the buildup of litter, which is fouling the environment, harming every life, and wasting valuable resources with the challenges and opportunities in converting plastic waste for use in industries [6]. Plastic has been estimated to account for 30% of all healthcare waste, and around one-third of waste is from intensive care area or from anaesthetics [7]. WHO reported that the proportion of plastic hospital waste varies between countries, like 12% in Peru, 27% in Jordan and 46% in Italy, and differences probably relate to the differential use of SUP [8].

Kumar reported that in 2019, the global production of plastic was at 370 million tons, with only 9% of it being recycled, 12% being incinerated, and the remaining left in the environment or landfills [9]. The global medical plastics market is worth US\$22.26 billion, 2% of total plastic production is growing by 6.1% per year [10]. This is also one big challenge. Sastri reported that US was consuming around 40% of medical devices manufactured globally, followed by Europe and Japan [11]. Modjarrad reported that growth in this sector was likely to be driven by increasing demand in healthcare in other countries, Brazil, Russia, India and China [12]. With highest compound annual growth rates (6.9%) in the Asia-Pacific region. Plastic products including gloves, tubing and blood sample tubes were among the largest contributors to carbon emissions of all those procured by the National Health Services in England [13].

Thompson reported that inappropriate disposal meant that plastic fragments, which comprised 50–80% of shoreline debris, went into system [14]. The proportion of medical plastics disposed by different means vary with the facilities available in healthcare units, regions and countries as well as the knowledge and attitude of the staff in those units. Sustainable Development Unit reported that less than 5% of plastic healthcare waste was recycled in the UK [13]. Study by McGain revealed that 64% of operation theatre plastic could be recycled [15]. A study from South Korea by Lee found that 40% of hospital waste was, disposable, syringes, tubing or intravenous and blood bags, all of which have potential for recycling [16]. A survey of UK and Australian anaesthetists found that the major perceived barriers to recycling were inadequate facilities (49%), staff attitude (17%) and inadequate information (16%) [17]. An Australian study by McGain revealed that 8% of contaminated plastic waste in anaesthesia could be recycled [7]. Additional challenges to recycling included the need to separate plastics by type, inadequate labelling of plastic and differential processing of plastics contaminated with body fluids or other potentially infectious waste.

#### 4. Possibilities

The responsibility and potential for change need engagement and support from healthcare professionals, organizations, patients, society at large, who can look at improving awareness, using reusable items where possible, and support development and use of recycling or reprocessing facilities. The change also needs to include the healthcare manufacturing industry through either voluntary or legislative changes can partner in reprocessing or recycling of products, reduction or replacement of plastic packaging, advocacy and contribution to life cycle assessments [1]. In a study patients were willing to compromise for disposable reusable vaginal specula for more sustainable healthcare [17]. Many techniques, such as absorption, coagulation, photocatalysis, and microbial degradation, reduction, reuse and recycling are potentially in trend and differ from each other in their efficiency and interaction mechanism. Moreover, substantial advantages and challenges associated with the techniques and approaches need to be understood to develop an understanding of the selection of possible ways for a sustainable future. In addition to the reduction of plastic waste from the ecosystem, many alternative opportunities have also been explored to cash plastic waste. They include the synthesis of adsorbents for the removal of pollutants from aqueous and gaseous stream, their utility in clothing, to make energy and fuel and in construction (road making). Substantial evidence can be observed in the reduction of plastic pollution from various ecosystems. In addition, to the importance of developing understanding of factors that need to be emphasized, while considering alternative approaches and opportunities to cash plastic waste like adsorbent, clothing, waste to energy and fuel. Plastic ban policies and public awareness are likely to be the major mitigation interventions. The need for life cycle assessment and circularity to assess the potential environmental impacts and resources used throughout a plastic product's life span is essential. Innovations are needed to reduce, reuse, recycle, and recover plastics and find eco-friendly replacements for plastic products. Empowering and educating

communities and citizens to act collectively to minimize plastic pollution and use alternative options for plastics must be promoted and enforced. Plastic pollution is a global concern that must be addressed collectively with the utmost priority. Raw material used in plastic production, rational use, collection, re-use, and innovative recycling are key measures to curb plastic pollution. Plastics product that cannot be recycled after use must be biodegradable in benign manner. Harmful plastic additives must be replaced with safer alternatives to reduce toxicity burdens and include the ongoing negotiations surrounding the United Nations Plastics Treaty [19]. Although full substitution of plastics is currently not possible, alternatives with smaller environmental impacts should be used and endorsed within a clear socio-economic framework. By reducing reliance on SUP, such as bags, bottles, straws etc., it is possible to minimize the waste that ends up in the environment. Opting for reusable alternatives, like cloth bags and stainless-steel water bottles is a small but powerful step towards beating plastic pollution. Disposable bowls, plates, glasses can sure be replaced by organic reusable biodegradable material. Additionally, raising awareness in people, communities about the importance of responsible plastic usage can lead to a ripple effect of positive change. U turn is essential with some stars of new knowledge technology.

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