Carbon Footprint of Cataract Surgery

Topic Area(s)

Greenhouse gasses: linkages, emissions;

Estates and facilities (buildings, energy, waste, water);

Sustainable models of care;

Please specify your project approach

Both adaptation and mitigation

Key message / aim

A call to action for eye care professionals to reduce the carbon footprint of cataract surgery and raise awareness about the importance of sustainable practices in the field.

What was the problem?

In ophthalmic practice, the cataract surgery is considered to be one the most performed surgery worldwide, generating a substantial amount of waste.

What was the solution?

* Various stakeholders were involved, including ophthalmologists, ophthalmic manufacturers, and pharmaceutical companies.
* Education about sustainable practices requires making a green transition in the way surgeries are performed, including the choice of cataract techniques, the use of recyclable instruments, energy consumption methods, as well as adopting the 5R's approach of reduce, reuse, recycle, rethink, and research.
* I currently lack estimations for the following:
	+ Financial savings per annum.

What were the challenges?

* Most regulations in the ophthalmic industry are made with patient's safety in mind.
* Lack of awareness is also seen as a challenge. Based on some studies, there are no post-operative complications from following a green cataract surgery protocol ( The Aravind Hospital Model is a good roadmap that showcases how we can operate eco-consciously without compromising patient safety). Additionally, endophthalmitis was rarely observed in the Aravind green model.
* Procurement of supplies.

What helped the intervention implementation/success?

* Engaging a diverse range of stakeholders can foster collaboration while facilitating the sharing of best practices and innovations in sustainable methods and materials.
* Presence of organisations aiming to advocate and greening healthcare sector to reduce its environmental impacts and improve sustainability.
* Support from companies leading sustainability in the ophthalmic field.
* Aravind Eye Hospital model can be used as a reference and roadmap for implementing the 5 R’s of sustainability—Reduce, Reuse, Recycle, Rethink, and Research—to minimize waste.

What were the results/Impact?

Patient outcomes:

* The Immediate Sequential Bilateral Cataract Surgery is a brilliant technique to start with, both eyes are being performed in the same day which reduces travel costs and time savings for family members related to patient travel. From a clinical perspective,we have a quicker binocular vision recovery and the patient can quickly have a prescription for reading glasses ( depending on the clinical context)
* Post-operative check-ups can be reserved for patients who are experiencing complications or showing warning signs, this approach frees up space for other patients to be seen and reduces waiting times.
* Cost-effectiveness: The manual Small Incision Cataract Surgery (MSICS), is a technique that requires minimal equipment and resources compared to other techniques. Rehabilitation is faster with a shorter healing times due to the absence of suture-related complications. Moreover, this technique typically requires less postoperative follow-ups.

Population outcomes:

The healthcare sector is known to be responsible for approximately 4 to 5% of global greenhouse gas emissions. Considering the waste and carbon emissions (CO2-eq) associated with one single cataract surgery, including direct and indirect emissions, this impact significantly affects our planet and public health. Climate change resulting from these emissions is leading to an increase in eye diseases and other health issues.

Environmental impact:

The environmental impact of cataract surgery varies by regions and regulations. However, in my research paper, I have collected data from ophthalmologists located in different countries (Spain and France), which estimates emissions related to a single cataract surgery in Spain at 86.62kg CO2eq and 81.13kg CO2eq in France.

Social impact:

* Improving public health by minimising emissions and waste, leading to cleaner air and a decrease in respiratory and cardiovascular diseases.
* Sustainable practices lower surgical costs by reducing the use of disposable materials, making healthcare more affordable and accessible in low-income settings.
* Community Engagement by cultivating a shared commitment to protecting human health and the environment.
* Following a green healthcare model can create job opportunities, as new roles are needed to manage sustainability initiatives and training programs.
* Educating patients, staff, and communities on sustainability can inspire environmentally friendly behaviours.

Financial impacts:

* By priotising low-cost cataract techniques such as the Manual Small Incision Cataract Surgery (MSICS), a technique that requires minimal equipments and resources compared to other methods.
* Sustainable practices can result in long-term savings by lowering resource consumptions and waste management costs, which can enhance overall financial health.

What were the learning points?

* Global warming is a pressing issue. However, healthcare bodies are still facing significant limitations due to regulatory constraints, plus insufficient clinical studies supporting the safety of the reuse and certain cataract techniques.

Next steps

* Incorporating sustainability into our practices will open doors to more innovations that aim to reduce emissions related to patient travel, such as the use of teleophthalmology.
* Adopt energy-efficient technologies and waste reduction programs.
* There is still much to explore in reducing our environmental footprint. Close collaboration among all stakeholders, along with persistent tracking of efforts, is essential to achieving meaningful progress.

Want to know more?

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Has this case study or story been made public in any form before?Yes

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