Dental Waste and Environmental Impact: An Urgent Global Issue

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INTRODUCTION

Environmental degradation disproportionately affects vulnerable populations. Dental caries (cavities) are the most common non-communicable disease worldwide, and there is a push to improve global oral health. As oral health initiatives expand, especially in low-middle income countries (LMICs), management of dental waste must be considered as a forethought in order to avoid worsening health disparities.

OBJECTIVES

- Discuss dentistry’s contribution to global environmental waste of plastic, lead and silver, and mercury
- Review current published literature on dental waste and propose evidence-based recommendations regarding management of dental waste
- Pose questions for next steps and future research

RESULTS

Plastic

- Toothbrushes are not recyclable, and ~23 billion toothbrushes become trash annually. Ingesting marine life may experience physiological issues such as liver damage.
- Toothpaste contains plastic microbeads (<1mm) which can escape wastewater treatment plants.
- 8 trillion microbeads enter aquatic environments daily and cause cellular necrosis, inflammation, and laceration of tissue.
- Plastic trash generated in dental offices (patient bibs, disposable cups, headrest covers, suction tips) can represent over 90% of total waste volume of a dental office.

Lead & Silver

- Dental x-ray films are wrapped in lead foil.
- Lead can also be found in lead aprons and collars.
- Undeveloped x-ray films are hazardous due to their silver ion component.
- Silver compounds exist in used processing chemicals.
- Improperly disposing of lead and/or silver leads to adverse environmental impact.
- Lead and silver cause several health issues, including impaired brain development, carcinogenicity, renal function, and immunological disorders.

Mercury

- In the U.S., ~10-70% of mercury loading of many municipal sewage treatment plants is dental in nature.
- In Canada, the practice of dentistry discards ~686 kgs of mercury into wastewater every year.
- The toxic effects of mercury are distributed throughout the human body, particularly causing neurotoxic and nephrotoxic effects.
- The Minamata Convention on Mercury is a key multi-lateral agreement with a goal of mitigating mercury release into the environment to avoid these harmful effects.

MATERIALS & METHODS

Literature Search & Data Consideration
- Literature Search
  - Plastic Waste
  - Lead & Silver (X-ray Films)
  - Mercury (Amalgam)
- *Why Rwanda? environmental leader, new dental school

Policy Brief Recommendations
- Synthesize findings and prepare policy brief
- Rwanda* and Global Community
- Policymakers
- Dental Personnel
- Dental School Administration

DISSEMINATION OF RESULTS

FUTURE WORK

We are currently evaluating our findings, synthesizing the information, and developing suggestions. We are focusing on the case study of Rwanda. Potential areas of policy recommendations may include awareness campaigns, waste disposal protocols, and monitoring. Upstream considerations may focus on packaging and alternative methods.

Our next step is to create a policy brief that will be shared with Rwanda and the global community at large.

REFERENCES