

Series 2 – Social Pillar: Health

Implications of the Minamata Convention on Mercury on Oral Health in Kenya

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Key Messages

Dental amalgam is scheduled for a global phase-down. Several phase-down strategies are available to ensure that oral health is not affected by the unavailability of affordable dental treatment.

The expected impact is improved oral health status of Kenyans through the adoption of disease prevention and health promotion.

Furthermore, through improved access to affordable restorative dental care using low-cost alternative filling materials.

Context

The Minamata Convention on Mercury was convened by the United Nations Environment Programme in 2013 (UNEP, 2013) to discuss the environmental impact of mercury from industrial and other wastes. Dental amalgam, one of the oldest and affordable filling materials, is considered a mercury-based product and was listed, among others. The meeting recommended a global phase-out of all such products by 2020 except dental amalgam which was scheduled for a global phase-down.

This means that while industries and products that utilize mercury will be banned, usage of dental amalgam will be reduced for the time being. Moreover, reduction strategies for dental amalgam were documented for adoption by parties. Kenya is a signatory to the convention and is at an advanced stage towards becoming a party. This has huge implications for access to restorative dental treatment for a majority of the Kenyans (Osiro et al., 2019).

Dental caries or tooth decay is a ubiquitous public health problem. It affects 60-90 per cent of adults in industrialized countries (Petersen, 2004; Petersen, 2007). In Kenya, nearly 25 per

cent of adults and 50 per cent of children under 5-years suffer from the condition (Fig 1) (Kenya National Oral Health Survey, 2015).

Despite the high national prevalence of tooth decay, oral health is poorly funded and receives only 0.0016 per cent of the national budget for health, limited to 8 per cent of the total Government expenditure (Kaimenyi, 2004). This provision is grossly inadequate. Therefore, access to restorative dental care remains limited for the majority and often, removal of offending teeth is a cheaper alternative. Tooth loss affects mastication and speech and is associated with reduced quality of life (Petersen, 2004; Petersen, 2007).

For those who can access treatment in the form of fillings, dental amalgam remains the most readily available and preferred filling material in low- and middle-income countries, including Kenya as it is inexpensive, easy to use, and strong enough to withstand chewing forces (Petersen et al., 2009). Therefore, the phase-down of dental amalgam will have implications on oral health status in Kenya through the unavailability of affordable dental treatment. The strategies recommended for the phase-down of dental amalgam as documented in the convention report are presented in Box 1.



Box 1: Minamata Convention, Annex A, Part II4

Nine measures to phase down the use of dental amalgam:

- (i) Setting national objectives aiming at dental caries prevention and health promotion, thereby minimizing the need for dental restoration;
- (ii) Setting national objectives aiming at minimizing its use;
- (iii) Promoting the use of cost-effective and clinically effective mercury-free alternatives for dental restoration;
- (iv) Promoting research and development of quality mercury-free materials for dental restoration;
- (v) Encouraging representative professional organizations and dental schools to educate and train dental professionals and students on the use of mercury-free dental restoration alternatives and on promoting best management practices;
- (vi) Discouraging insurance policies and programmes that favour dental amalgam use over mercury-free dental restoration;
- (vii) Encouraging insurance policies and programmes that favour the use of quality alternatives to dental amalgam for dental restoration;
- (viii) Restricting the use of dental amalgam to its encapsulated form;
- (ix) Promoting the use of best environmental practices in dental facilities to reduce releases of mercury and mercury compounds to water and land.

Approach and Results

Our research explored locally available raw materials to determine whether they may be used to develop mercury-free alternative dental filling materials. A low-cost mercury-free alternative may be utilized in affordable non-invasive procedures to reduce the need for advanced dental treatment and may also provide job opportunities in the relevant industry.

In a laboratory-based study, we evaluated local aluminosilicate materials for use in cement for dental fillings. We have identified those based on kaolin to be the most promising due to their stability in moisture and the ability to release fluoride, an essential element in the prevention of tooth decay (Fig. 2). Further research is necessary to develop the prototype to acceptable quality that has adequate strength to withstand chewing forces.

Policy Recommendations

The measures in Box 1 are thematically interconnected to promote oral health

through disease prevention, reduce the need for restorations and encouraging best practice in the handling of dental amalgam waste.

Short-Term

- To set national objectives aimed at dental caries prevention and health promotion, to minimize the need for dental restoration;
- To encourage representative professional organizations and dental schools to educate and train dental professionals and students on the use of mercury-free dental restoration alternatives and on promoting best waste management practices.
- To promote research and development of quality mercury-free materials for dental restoration.
- Implementation of disease prevention and health promotion programmes to reduce dental disease prevalence.

Medium-Term

- Promotion and support from a national agency to improve prospects and eventual uptake of a locally developed mercury-free dental restoration product for minimally invasive procedures.

Acknowledgements

This policy brief is derived from a PhD awarded by the University of Nairobi in 2019. Support for this work is from the University of Nairobi, Kenya, the Consortium for Advanced Research Training in Africa (CARTA), the National Research Fund, Kenya and the DAAD, Germany.

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Fig 1: Gum disease and dental caries



Fig 2: Kaolin-based dental cement cylinders for compressive strength tests

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