

OP 4

Impacts of water treatment and storage conditions on drinking water quality.

Zawahid NA¹, Jamel NK¹, Abdul Razak F², Wan-Ibrahim WI²

1. Faculty of Dentistry, Universiti Malaya, Kuala Lumpur, Malaysia
2. Department of Oral & Craniofacial Sciences, Faculty of Dentistry, Universiti Malaya, Kuala Lumpur, Malaysia.

Objectives: This review aims to explore recent findings on water fluoridation system and its impact on oral health. The effects of water treatment and storage conditions on fluoride content and microbial activities in drinking water were also reviewed.

Methods: Collected data from web pages and peer-reviewed articles based on framed research questions were identified and organized systematically according to their relevance and priority. The findings were interpreted and summarised to correlate with the research questions.

Results: Fluoridation of community water supplies (0.7-1.2 ppm) is proven to minimize tooth decay. However, water purification systems may remove substantial amount of fluoride and unable to filter harmful microbes. In countries such as England, Greece and the USA, fluoride levels in commercially-bottled water range from 0.01 ppm to 0.74 ppm, far less than the effective concentration. Fluoride and chloride ions decreased when bottled drinking water made of polyethylene terephthalate (PET) was exposed to sunlight and temperatures higher than 35°C. Bottled drinking water also recorded bacterial presence of about 10³-10⁶ cfu/ml. Variation in temperatures and lack of lighting during storage created a dynamic environment suitable for microbial multiplication, compared to indoor cabinet and refrigerator that have a constant cool temperature. In terms of storage duration, microorganisms will continue proliferating as the storage period increases.

Conclusion: Fluoride levels and microbial activities in drinking water were influenced by water purification practice, sunlight exposure and temperature. Hence, consumers are advised to store drinking water at low temperature with indirect sunlight to minimize microbial activities and maintain the quality of the water.

Keywords: dental fluorosis, oral microbiome, temperature, storage, antimicrobial, dental caries