A Systematic Review of Pre-dive Glycerol Hydration versus Oral Rehydration Salts for Commercial Divers in the Suez Canal: Efficacy on Plasma Viscosity and Venous Gas Emboli

K, o, s, s, i, A, g, b, o, g, b, o, ,, A, f, i, M, a, w, u, s, s, i, ,, K, o, m, l, a, n, G, b, é, d, j, é

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Abstract

Commercial hard-hat divers in the Suez Canal work in a hot, hyperosmotic environment, which heightens the risk of dehydration. Dehydration can elevate plasma viscosity and post-dive venous gas emboli (VGE), thereby increasing the potential for decompression illness. Pre-dive hydration is a key countermeasure, with glycerol-based solutions and standard oral rehydration salts (ORS) representing two prevalent strategies. This systematic review compared the efficacy of pre-dive glycerol hydration versus standard ORS for commercial divers in the Suez Canal region. The specific objectives were to evaluate their impact on plasma viscosity and post-dive VGE bubble grade. A systematic search of peer-reviewed literature was performed across major biomedical databases. Included studies were primary research involving commercial hard-hat divers that directly compared glycerol to ORS and measured plasma viscosity and/or VGE. Data extraction and quality assessment were conducted independently by two reviewers using standardised tools. From 127 identified records, only two small-scale field studies met the inclusion criteria. Both studies reported a reduction in plasma viscosity with glycerol compared to ORS. Glycerol hydration was also associated with a lower post-dive VGE bubble grade; one study documented a 40% reduction in high-grade VGE (Spencer Grade ≥ III) following glycerol administration. The limited available evidence suggests that pre-dive glycerol hydration

may be more effective than standard ORS in reducing plasma viscosity and high-grade VGE in this specific diving cohort. However, the small number of studies and their methodological constraints prevent definitive conclusions. Further high-quality, controlled trials with larger sample sizes are urgently needed. Pending such evidence, dive operators may consider the potential benefits of glycerol but must prioritise adherence to established hydration protocols and vigilant monitoring for adverse effects. Diving medicine, hyperbaric medicine, dehydration, glycerol, oral rehydration salts, plasma viscosity, venous gas embolism, commercial diving, Suez Canal. This review synthesises the existing evidence on two pre-dive hydration strategies for a specialised occupational group, highlighting a significant evidence gap and guiding priorities for future research in African diving and hyperbaric medicine.