



Silver Nanoparticles for Chronic Wound Healing in Tertiary Care Facilities Across South African Cities: Six-Month Observations

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Abstract

Chronic wounds pose significant challenges in tertiary care facilities across South African cities, necessitating innovative solutions for effective management. A randomized controlled trial was conducted with participants from Tertiary Care Facilities (TCFs) across South African cities. Participants were randomly assigned to either a control group using conventional dressings or an experimental group receiving silver nanoparticle-based treatments. Wound healing outcomes and safety profiles were evaluated at baseline, three months, and six months post-treatment. A total of 150 participants completed the study. The silver nanoparticle group showed significantly faster wound closure rates compared to controls ($p < 0.001$), with an average improvement in healing time by 32% over six months, indicating a substantial therapeutic effect. Silver nanoparticles demonstrated efficacy and safety for chronic wound healing in urban TCF settings. These findings support the clinical adoption of silver nanoparticle-based therapies to enhance wound management outcomes. Further research is recommended to explore long-term effects and potential synergies with other treatments, while ensuring regulatory compliance for widespread use. Treatment effect was estimated with $\text{text}\{logit\}(\pi) = \beta_0 + \beta^T p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African, Silver Nanoparticles, Chronic Wounds, Clinical Validation, Tertiary Care, Microparticles, Randomized Controlled Trial*

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