African Nuclear Physics (Pure Science)

Methodological Evaluation of Off-Grid Communities Systems in Senegal: Randomized Field Trial on Clinical Outcomes

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Abstract

Off-grid communities in Senegal face challenges in accessing reliable electricity, which affects health outcomes through limited access to medical facilities and technologies. A controlled intervention study was conducted with 200 participants randomly assigned to either an experimental group receiving enhanced off-grid power supply or a control group. Data collection included pre- and post-intervention assessments, focusing on clinical outcomes such as patient wait times at health centers and satisfaction levels among healthcare providers. Analysis revealed a significant decrease in average patient wait times by 30% (95% CI: -28.5%, -31.5%) in the experimental group compared to baseline, indicating improved access to medical care and better service quality. The study demonstrated that enhanced off-grid power systems can significantly improve clinical outcomes in Senegalese communities by reducing wait times at health centers. Further research should explore scalability of these findings across different regions and potential cost-effectiveness analyses. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, Africa, Literature, SocialExperimentation, QualitativeResearch, RandomizedControlledTrial, HealthImpactAssessment*

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