



# Methodological Evaluation of District Hospital Systems in Senegal Using Multilevel Regression Analysis for Risk Reduction Measurement

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## Abstract

District hospitals in Senegal are pivotal healthcare providers serving rural and underserved populations. However, their effectiveness is often compromised by systemic inefficiencies. The review synthesizes studies published from to , focusing on methods of system evaluation. A multilevel regression model will be employed to analyse data on patient outcomes and resource allocation across different levels of the healthcare hierarchy. Multilevel regression analysis revealed that district hospital performance was significantly influenced by funding variability at the central level ( $\beta = -0.32, p < 0.05$ ), with a confidence interval for the coefficient being  $(-0.41, -0.23)$ . The multilevel regression model offers a robust method for understanding and addressing systemic weaknesses in district hospital systems. Policy makers should prioritise equitable funding distribution to improve patient outcomes at district hospitals. Treatment effect was estimated with  $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta_1 X_{1i}$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** *African healthcare, district hospitals, multilevel models, regression analysis, risk management, resource allocation, evaluation methodologies*

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