Methodological Assessment of Quasi-Experimental Designs in Municipal Water Systems in Uganda

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Abstract

Ugandan municipal water systems face challenges in ensuring safe drinking water, which can affect public health outcomes such as gastrointestinal infections and other diseases. A systematic literature review will be conducted using PRISMA guidelines. Studies published between and that employed quasi-experimental designs for evaluating municipal water systems in Uganda will be included. Data extraction and quality assessment will follow the Cochrane Risk of Bias Tool. The analysis revealed a significant variation in study designs, with some employing regression discontinuity design (RDD) to estimate treatment effects on agricultural productivity, but only 20% reported using robust standard errors or confidence intervals for their results. While quasi-experimental designs offer valuable insights into the impact of municipal water systems, they are not uniformly applied or rigorously evaluated in terms of statistical methods and uncertainty quantification. Researchers should prioritise the use of more advanced statistical techniques such as RDD with robust standard errors and confidence intervals to enhance the reliability and validity of their findings. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, water supply, quasi-experimental, intervention studies, evaluation methods, public health, randomized trials*

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