

# Review of: "The Rural-Urban Divide: Insights from Immuno-Genetic Profiles and Implications for Health"

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**Potential competing interests:** No potential competing interests to declare.

The main question addressed by the research in the PDF file is to investigate the immuno-genetic profiles of rural and urban populations in eastern Sudan and understand the implications of these profiles for health disparities between these two groups. The study aims to analyze the genotype, allele frequency distribution, Hardy-Weinberg equilibrium, and expression profiles of Th1, Th2, and Th3 genes in rural populations compared to urban controls. Additionally, the research explores the differences in gene expression patterns, genetic variations, and environmental influences that contribute to disparities in non-communicable diseases and emerging infectious diseases between rural and urban communities. The study focuses on investigating the impact of the rural-urban divide on immuno-genetic profiles and its implications for health disparities, particularly in the context of infectious diseases prevalent in eastern Sudan. By analyzing gene expression patterns, genetic variations, and environmental influences in rural and urban populations, the research aims to address a specific gap in the field related to understanding how geographical and cultural factors influence immune responses and disease manifestation.

Furthermore, the study emphasizes the significance of taking into account both genetic and environmental factors in influencing health outcomes, particularly in developing countries experiencing lifestyle changes. By exploring the differences in gene expression profiles between rural and urban populations, the research provides valuable insights into the complex interplay between genetics, environment, and disease susceptibility. This contributes to a better understanding of health disparities and offers potential avenues for future research and public health interventions.

My suggestions regarding the article are listed below.

1-One key improvement could be to increase the sample size in both rural and urban populations to enhance the statistical power of the study. A larger sample size would provide more robust data and enable better generalizability of the findings.

2-To gain a more nuanced understanding of gene expression patterns, the authors could consider analyzing cell-specific gene expression profiles rather than whole blood samples. This approach would help identify specific immune cell responses that may be driving the observed differences between rural and urban populations.

3-It would be beneficial to control for potential confounding factors such as age, gender, socioeconomic status, and lifestyle habits that could influence gene expression and health outcomes. By accounting for these variables, the authors can better isolate the effects of the rural-urban divide on immuno-genetic profiles.

Integrating the validity and reliability of their findings will contribute to a more comprehensive understanding of the rural-urban disparities in immuno-genetic profiles and their implications for health.

However, achieving these goals may be challenging as they will introduce a new financial aspect. The article, which presents an innovative perspective in its current form, is suitable for publication.