Title: Correlations of Rural-Urban Differences in Geographic Healthcare Access Coverage and other Access Measures: An Ecological Study of 128 Countries

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Conflicts of Interest: None

Background:
Inequities in healthcare access, influenced by adverse economic and geographic factors, between rural-urban regions is an important global issue. This study aims to find associations between country-level rural-urban estimates for geospatial access by walking and motorized transport to healthcare facilities and various other global indicators for rural-urban healthcare accessibility.

Methods:
The binarized Urban-Rural Catchment Area (URCA) raster (1km²) gave rural (CA label > 7) and urban (CA label = 1 to 7) areas. Malaria Atlas Project (MAP) provided rasters for motorized and walking travel times to healthcare facilities (1 km²), while 1 km² resolution population counts came from WorldPop. Administrative boundaries of countries were taken from GADM-3.6. We defined healthcare access coverages (HAC) as the population proportions (%) within 60 minutes from their nearest healthcare facility by motorized (HAC-M₆₀) and 30 minutes by walking (HAC-W₃₀) modes of transport, respectively. The rural-urban values for HAC-W₃₀ and HAC-M₆₀ are denoted as RMU_HAC-W₃₀ and RMU_HAC-M₆₀, respectively. The rural-urban values for the following health deficit indicators from the International Labour Office (ILO) dataset: legal health coverage deficit (LHCD, % of population without legal coverage), out-of-pocket expenditure (OPE, % of total health expenditure), financial deficit (FD, % population not covered due to financial resource deficit), staff access deficit (SAD, % population not covered due to health professional staff deficit), and maternal mortality ratio (MMR, maternal deaths per 10,000 live births). were calculated as RMU_LHCD, RMU_OPE, RMU_FD, RMU_SAD and RMU_MMR respectively. We analyzed the correlations of rural-urban differences for ILO deficit indicators with the rural-urban differences in HAC-M₆₀ and HAC-W₃₀ using Spearman’s Rank Correlation.
Findings:
For 128 countries, RMU_HAC-M60 correlated with RMU_FD (r=0.31, p<0.001), RMU_SAD (r=0.29, p<0.001), RMU_MMR (r=0.28, p<0.001), RMU_OPE (r=0.22, p=0.0008), and RMU_LHCD (r=0.12, p=0.035). RMU_HAC-M30 correlated with RMU_MMR (r=0.23, p=0.0008) and RMU_OPE (r=0.145, p=0.0369) but not with RMU_LHCD (r=0.11056, p=0.286), RMU_SAD (r=0.08, p=0.165), RMU_FD (r=0.07, p=0.1411).

Interpretation:
Our analysis depicts the inter-relationships between rural-urban disparities in geographic access to healthcare facilities and those in other indicators for health access. Our findings are limited by parent data sources. Future studies should investigate the associations between rural-urban disparity metrics.

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