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Abstract

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An Area Deprivation and Geospatial Analysis of Ophthalmology Access Disparities in Florida

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Abstract

Purpose:

This study examines disparities in ophthalmology access across Florida focusing on the correlation between area deprivation and the distribution of ophthalmologists. By employing the Area Deprivation Index (ADI) and spatial analysis methodologies, the goal was to identify geographical disparities in ophthalmologist availability and their correlation with socioeconomic indicators.

Materials and Methods:

We compiled a dataset of 2,567 ophthalmologists in Florida utilizing the National Provider Identifier (NPI) registry, identified by taxonomy code 207W00000X. Ophthalmologists were stratified based on ADI scores derived from both the ADI's national percentile ranking and state decile. Descriptive statistics were computed using SPSS. Spatial analysis techniques were applied using ArcGIS to visualize the distribution of ophthalmologists. Additionally, spatial autocorrelation analysis was conducted to explore clustering patterns.

Results:

The analysis reveals significant health inequities in ophthalmology access. Ophthalmologists were predominantly located in regions characterized of low to moderate deprivation levels, with 88.5% practicing in ADI percentile ranges 0-75, and 11.5% in the highest deprivation range; 0-25 (22.2%), 26-50 (35.5%), 51-75 (30.9%), 76-100 (11.5%). Analysis of national ADI reveals mean of 45.44 (IQR 28-63) and a state decile mean of 4.95 (IQR 3-7). Spatial visualization demonstrated uneven distribution, with clusters of ophthalmologists observed in specific geographic areas. Spatial autocorrelation analysis confirmed significant clustering (Global Moran's $I = 0.985$, $p < 0.05$).

Conclusion:

This study highlights substantial disparities in ophthalmology access across Florida, with ophthalmologists disproportionately concentrated in areas of lower deprivation. It reveals the necessity of addressing socioeconomic determinants in the allocation of healthcare resources to ensure equitable access to ophthalmological services. The methodology employed in this study, integrating NPI data with the Area Deprivation Index and spatial analysis techniques, provides a robust framework for examining ophthalmologist distribution and health disparities. This methodology can be extrapolated to other states to assess and mitigate similar challenges pertaining to healthcare access and equity on a national scale.