

## **A Study on the Relation among Primary Care Professionals Serving Disadvantaged Community, Socioeconomic Status, and Adverse Health Outcome**

**Authors :** Chau-Kuang Chen, Juanita Buford, Colette Davis, Raisha Allen, John Hughes, James Tyus, Dexter Samuels

**Abstract :** During the post-Civil War era, the city of Nashville, Tennessee, had the highest mortality rate in the country. The elevated death and disease among ex-slaves were attributable to the unavailability of healthcare. To address the paucity of healthcare services, the College, an institution with the mission of educating minority professionals and serving the under served population, was established in 1876. This study was designed to assess if the College has accomplished its mission of serving under served communities and contributed to the elimination of health disparities in the United States. The study objective was to quantify the impact of socioeconomic status and adverse health outcomes on primary care professionals serving disadvantaged communities, which, in turn, was significantly associated with a health professional shortage score partly designated by the U.S. Department of Health and Human Services. Various statistical methods were used to analyze the alumni data in years 1975 - 2013. K-means cluster analysis was utilized to identify individual medical and dental graduates into the cluster groups of the practice communities (Disadvantaged or Non-disadvantaged Communities). Discriminant analysis was implemented to verify the classification accuracy of cluster analysis. The independent t test was performed to detect the significant mean differences for clustering and criterion variables between Disadvantaged and Non-disadvantaged Communities, which confirms the "content" validity of cluster analysis model. Chi-square test was used to assess if the proportion of cluster groups (Disadvantaged vs Non-disadvantaged Communities) were consistent with that of practicing specialties (primary care vs. non-primary care). Finally, the partial least squares (PLS) path model was constructed to explore the "construct" validity of analytics model by providing the magnitude effects of socioeconomic status and adverse health outcome on primary care professionals serving disadvantaged community. The social ecological theory along with statistical models mentioned was used to establish the relationship between medical and dental graduates (primary care professionals serving disadvantaged communities) and their social environments (socioeconomic status, adverse health outcome, health professional shortage score). Based on social ecological framework, it was hypothesized that the impact of socioeconomic status and adverse health outcomes on primary care professionals serving disadvantaged communities could be quantified. Also, primary care professionals serving disadvantaged communities related to a health professional shortage score can be measured. Adverse health outcome (adult obesity rate, age-adjusted premature mortality rate, and percent of people diagnosed with diabetes) could be affected by the latent variable, namely socioeconomic status (unemployment rate, poverty rate, percent of children who were in free lunch programs, and percent of uninsured adults). The study results indicated that approximately 83% (3,192/3,864) of the College's medical and dental graduates from 1975 to 2013 were practicing in disadvantaged communities. In addition, the PLS path modeling demonstrated that primary care professionals serving disadvantaged community was significantly associated with socioeconomic status and adverse health outcome ( $p < .001$ ). In summary, the majority of medical and dental graduates from the College provide primary care services to disadvantaged communities with low socioeconomic status and high adverse health outcomes, which demonstrate that the College has fulfilled its mission.

**Keywords :** disadvantaged community, K-means cluster analysis, PLS path modeling, primary care

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