Spatial Planning as an Explanatory Factor in the Spatial Distribution of COVID-19 in Kampala City

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Abstract:

Spatial Planning has long been recognized as a vital factor in the dynamics of pandemics and has previously played a major role in the long-term eradication of health crises (Gouveia & Kanai, 2020). However, in the context of COVID-19, it has not been comprehensively explored among the most critical spheres in addressing the disease spread. This study, therefore, focused on assessing the impact of spatial planning on the spread of COVID-19 in Kampala City, Uganda. This assessment was done based on the confirmed COVID-19 cases registered between 21st March 2020 and 27th March 2021 and the Kampala Physical Development Plan of 2012 as a standard to determine the level of conformance to spatial planning in Kampala City. The methods used for the study were the global Moran's Index, Anselin's Local Indicator of Spatial Association (LISA), Post-Classification Change detection, and the Geographically Weighted Regression (GWR) model. The Global Moran's I was used to determine global spatial autocorrelation whereas Anselin's LISA was used to determine the local spatial autocorrelation. The post-classification change detection (Raja et al., 2013). was used to determine the level of conformance to spatial planning between the Kampala physical development plan and the existing land uses. On the other hand, the GWR (Fotheringham et al. 1992) was used to model the relationship between conformance to spatial planning and the spatial distribution of COVID cases.

Spatial distribution results show that the distribution characteristics of COVID-19 across Kampala are distinct with instances of clustering. Parishes located in the Central Business District were identified as the major disease risk whereas those located in the suburb Divisions of Kawempe, Makindye, Nakawa, and Rubaga were identified as cold spots of COVID-19. The trend of spatial planning in Kampala shows that the city is moving towards mixed-use developments with a positive non-conformity of 25.11%. Analysis through the GWR revealed a negative relationship between spatial planning and spatial distribution of COVID-19. This indicated that with increased adherence to the Spatial planning guidelines, the less risk of transmission and infection of COVID-19 as shown in Figure 1. Also, relationship results further specified that spatial planning could explain 51% of the variations in the spatial distribution of COVID-19 cases within Kampala City.
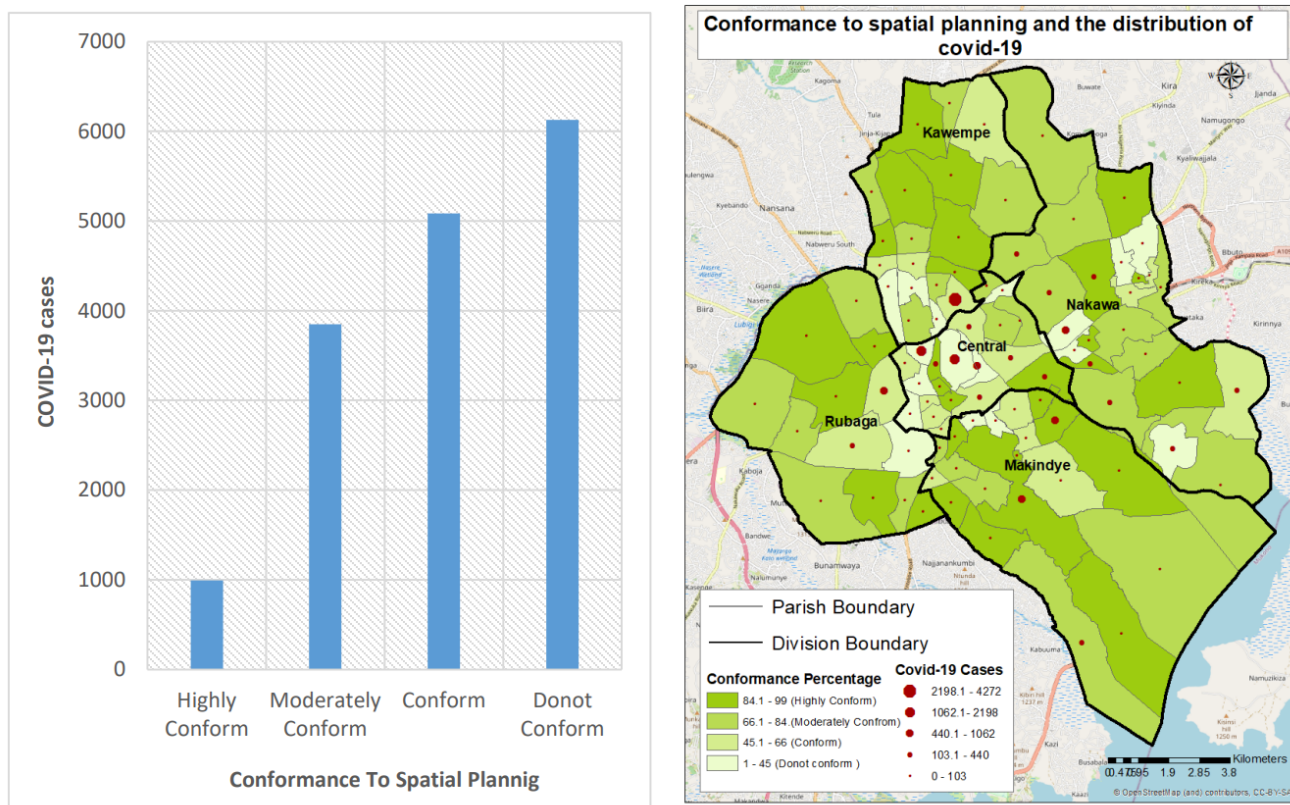
Figure 1: Relationship between COVID-19 and Conformance to Spatial Planning

Therefore, to transform Kampala into a pandemic-resilient city, there is a need to develop appropriate compact spatial planning designs, especially in the parishes of Nakasero I, Nakasero II, Nakasero III, and Kagugube.