WHERE DO POLICE KILL?

Spatial Predictors of Police Lethality in São Paulo City

INTRODUCTION

Violence remains a pressing issue in Brazil. In 2023, the country recorded 38,595 homicides, with **São Paulo being one of the states with the most murders recorded**. While violence in Brazil is often attributed to organized crime, **a substantial portion stems from the State.** In 2023 alone, 504 people were murdered by the police in São Paulo State, an average of **1.3 victims per day.** These figures raise questions about the nature of state violence: **where** it happens, under **what conditions**, and **who** is affected the most.

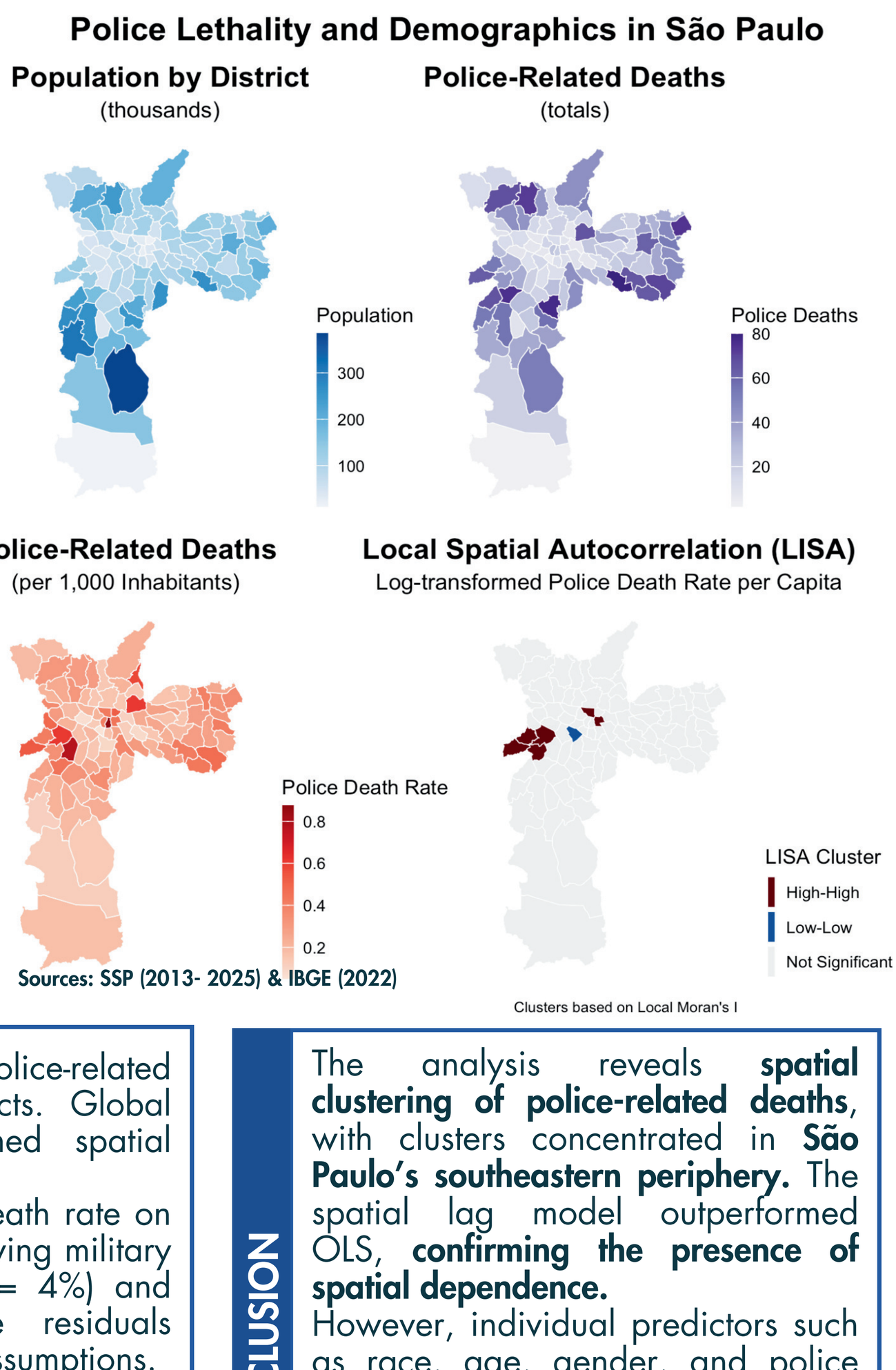
OBJECTIVE

This research aims to analyze the **spatial distribution of police killings** in São Paulo city and identify the factors that contribute to police lethality in the city.

METHODOLOGY

A spatial analysis of police-related deaths in São Paulo (2013–2025) was conducted using the following approach:

- **Data Cleaning:** Filtering the data to include police-related homicides in the city of São Paulo, removing duplicates and missing values.
- **Spatial Aggregation:** Individual deaths were geocoded and aggregated to administrative districts.
- **Variable Construction:** Created district-level variables. Death counts were normalized by population and log-transformed to reduce skewness.
- **Exploratory Spatial Analysis:** Local Moran's I (LISA) was applied to detect spatial clusters of high and low police lethality and to visualize the results through cluster maps.
- **Spatial Regression:** Comparing Ordinary Least Squares (OLS), Spatial Lag Model (SLM), and Spatial Error Model (SEM) specifications. Residual spatial autocorrelation was tested using Moran's I.



RESULTS

- **LISA:** Significant High-High clusters of police-related deaths were identified in peripheral districts. Global Moran's I (0.217, $p < 0.001$) confirmed spatial dependence.
- **OLS Model:** Regressing the log-transformed death rate on victim-level indicators (race, age, sex, % involving military police) yielded low explanatory power (R^2 = 4%) and significant spatial autocorrelation in the residuals (Moran's I = 0.18, $p < 0.01$), violating OLS assumptions.
- **Spatial Lag Model:** Accounting for spatial dependence ($\rho = 0.40$, $p < 0.001$) improved model performance, but none of the victim-level predictors were statistically significant.
- **Extended Spatial Lag Model:** Adding socio-economic variables (% favela area, income per capita, population density) improved model fit (AIC = –1418.3), yet no individual variable reached significance.

CONCLUSION

The analysis reveals **spatial clustering of police-related deaths**, with clusters concentrated in **São Paulo's southeastern periphery.** The spatial lag model outperformed OLS, **confirming the presence of spatial dependence.**

However, individual predictors such as race, age, gender, and police affiliation were not statistically significant.

Future analyses should incorporate **contextual variables** such as other crime indicators and the presence of organized crime to better explain spatial patterns of police lethality.

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