Fast Food Density and The Risk of Colorectal Cancer in Oklahoma between 2003 and 2012

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BACKGROUND

- Oklahoma had a higher incidence and mortality rate of colorectal cancer (CRC) than the U.S. overall rates between 2007 and 2012.
- In 2000, Oklahoma had a higher number of fast food restaurants (FFRs) per square mile (ranked 15th) and per population (ranked 18th) as compared to the other states in the U.S.

RESEARCH AIMS

- To explore the association between fast food density and CRC risk in Oklahoma between 2003 and 2012 while controlling for other related-risk factors including age, gender, race/ethnicity, and poverty.
- To develop a model that predicts CRC risk at the census tract level.
- To identify high risk areas for CRC.

MATERIALS AND METHODS

- An estimate for 2000 and 2008-2012 census tract population data were obtained from the U.S. Census Bureau.
- An Oklahoma licensed facility data from 1991-2015 (n=80,027) was obtained from the Oklahoma State Department of Health (OSDH), Department of Protective Health Services.
- CRC cases from 1997-2012 were acquired from the OSDH, Oklahoma Central Cancer Registry (OCCR).
- Two statistical approaches were applied to find the best model fit for study data, which included a Geographically Weighted Poisson Regression (GWPR) and a non-spatial Log-linear Poisson Regression model.

RESULTS

- The distribution of the crude CRC incidence rates in Oklahoma between 2003 and 2013 was randomly dispersed (Figure 1). Moreover, the spatial relationship between the outcome and explanatory variables was also not significant found based on the result of the Global Moran’s Z scores and p-values (Table 1), thus a non-spatial Log-linear Poisson Regression model was used.
- There was not a significant relationship between fast food density and CRC risk in Oklahoma between 2003 and 2010 after accounting for other related-risk factors in the model (Table 2, p-value = 0.0645). This association was also observed for male and below poverty populations (Table 2, p-value = 0.7196 and 0.1816, respectively).
- There was a significant inverse relationship between CRC risk and the age population of persons < 50 and 50-64 years (Table 2, p-value < 0.0001 and p-value = 0.0016, respectively).
- Race/ethnicity was significantly related to the risk of CRC as well (Table 2, p-value < 0.0001)

DISCUSSION / CONCLUSION

- Although the relationship between fast food density and CRC risk was not significant found and the distribution of the crude CRC incidence rates was randomly dispersed in Oklahoma between 2003 and 2012 (Table 2), the non-spatial log-linear regression model-based map for the Oklahoma CRC incidence rates indicated that rural areas have a higher incidence rate of CRC than urban regions (Figure 2).
- This suggested that CRC might correlate with other important risk factors that were not able to be included in this model instead of the fast food density alone such as screening rates, percentage use of healthcare coverage, obesity rates, diabetes (particularly Type II) rates, percentage of alcohol intake, smoking rates, and percentage of educational attainments measuring at the census tract level.
- Future research in this area needs to replicate the study in fully concern with these foregoing limitations. Moreover, the high incidence rate of CRC among rural populations in Oklahoma calls for research into effective rural interventions.

REFERENCES