

Exploration of Infant Mortality Rates in Ohio: An Extrapolation by County

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Background

For decades, researchers have attempted to investigate the infant mortality rate gap in African American communities. Defined as the number of infant deaths per 1,000 live births, infant mortality rate is widely used to measure not only the health of a given community or population, but to measure the quality of healthcare and services. According to the 2019 Ohio Infant Mortality report, of 929 Ohio infants that died before their first birthday, there were 356 Black infant deaths, approximately a 5% increase from the previous year¹. Ohio ties with South Carolina with the 9th highest infant mortality rate (IMR) at 6.97 per 1,000 live births in the United States⁴.

Despite research, commitments and programs to understand and close infant mortality gaps, disparities still persist.

Purpose

This study seeks to explore infant mortality in the state of Ohio with a purpose of extrapolating Ohio county infant mortality data to identify differences that exist between its racial and ethnic populations. This study sets out to establish infant mortality trends, and highlight counties of focus in order to develop effective vital public healthcare programming and policies.

It is anticipated that the findings of this study would inspire further research that illuminates existing disparities, and promotes improvement in the outcomes of Ohio's birthing population.

Methods

This study examined population data on 134,560 live births and 929 deaths in Ohio. Existing records of live births and total deaths collected and extrapolated from the Ohio Department of Health 2019 Infant Mortality Annual Report were utilized. The July 2019 U.S. Census Bureau Report provided the total population and demographic data for this study.

With 88 counties in Ohio, this study included information on the total population, total live births, total deaths, infant mortality rate per 1,000 live births, and focused on the two specific racial groups: White and African American.

Resident Birth, Mortality, and Infant Mortality period datasets were used to calculate the total live births, total deaths, and infant mortality rates associated with each county¹. Pearson correlations and linear regressions were utilized to evaluate the relationship between races and Total Live Births, Total Deaths, and Infant Mortality Rate.

Results

Correlations			
		WHITE	AA
IMR	Pearson Correlation	-.160	.196
	Sig. (2-tailed)	.137	.067
TLB	N	88	88
	Pearson Correlation	-.847**	.860**
TD	Sig. (2-tailed)	.000	.000
	N	88	88
IMR	Pearson Correlation	-.852**	.890**
	Sig. (2-tailed)	.000	.000
TLB	N	88	88
	Pearson Correlation	-.852**	.890**
TD	Sig. (2-tailed)	.000	.000
	N	88	88

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlations			
		IMR	AA
Pearson Correlation	IMR	1.000	.196
	AA	.196	1.000
Sig. (1-tailed)	IMR	.	.034
	AA	.034	.
N	IMR	88	88
	AA	88	88

The Pearson correlation values for the White population shows a large statistically significant negative relationship with Total Live Births (TLB) and Total Deaths (TD) ($p < 0.01$). As one variable increases, the other variable decreases. The Pearson correlation values for the African American population shows a large statistically significant positive relationship with TLB and TD ($p < 0.01$). As one variable increases, so does the other variable.

The one-tailed correlation value for the African American population shows a statistically significant correlation with Infant Mortality Rate (IMR) ($p < 0.05$).

Simple Regression Showing Significant Predictors of Total Live Births

Predictors	Beta	t	R ²	p-value
White	-296.44	-14.747	0.717	0.000
African American	396.772	15.652	0.740	0.000

Simple Regression Showing Significant Predictors of Total Deaths

Predictors	Beta	t	R ²	p-value
White	-2.379	-15.101	0.726	0.000
African American	3.273	18.119	0.792	0.000

Simple Regression Showing Predictors of Infant Mortality Rate

Predictors	Beta	t	R ²	p-value
White	-0.69	-1.499	0.025	0.137
African American	0.112	1.854	0.038	0.067

The White population had negative beta coefficients for all three dependent values indicating it is a negative predictor. African American population was a positive predictor. For every one percent increase in White population, the TLB, TD, and IMR decreases by 296 births, 2 births and 0.07 respectively. For every one percent increase in African American population, the TLB, TD, and IMR increases by 397 births, 3 births and 0.1 respectively. The findings for TLB and TD were statistically significant with a p value of 0.000. The findings for IMR were not significant.

Discussion

- Based on this study alone, it cannot be concluded that changes in White or African American population, causes changes in infant mortality rate, total live births, or total deaths.
- Our results do however show a statistically significant negative correlation between White population and Total Deaths and a statistically significant positive correlation between African Americans and Total Deaths.
- Our results warrant further studies to better examine the impact racial disparities have on infant mortality in Ohio and the United States as a whole.
- The statistically significant one-tailed correlation between IMR and African American population indicates the need for further studies using a larger sample size to evaluate significance of correlations between African American population and IMR in 2-tailed Pearson correlations and regressions.
- The study originally surveyed public health departments, requiring institutional review board approval; however, the trajectory of the study was altered due to challenges and demands of the COVID-19 pandemic on public health departments. This study based its concluding results utilizing publicly available secondary public health data; therefore, the study was unable to collect or assess other predictors such as direct characteristics of the birthing mothers.

Conclusion

There is a need for the consistent focus and development of advocacy in practice and policy to address the state of infant mortality and racial health care disparities in Ohio. While our results suggest a positive correlation between African Americans and Total Deaths, and African Americans and Total Live Births, a study with a larger sample size, and specified variables impacting patient outcomes such as experiences with racism, and overall quality of prenatal care, should be conducted to evaluate possible correlations between race and Infant Mortality Rate.

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