Unraveling the Influence of Social Determinants of Health on Diabetes Prevalence in Appalachia

Samuel Borgemenke, OMS-II;[1] Allyson S. Hughes, PhD[1]

[1]Diabetes Institute, Ohio University Heritage College of Osteopathic Medicine, Athens, OH

OHIO UNIVERSITY
Heritage College of Osteopathic Medicine

Background

- Nationally, there was an estimated total prevalence of 37.3 million individuals with diabetes in 2019 (28.7 million diagnosed, 8.5 million undiagnosed).
- Appalachian Ohio exhibits a diabetes prevalence that is more than twofold that of national average.
- Southeastern Ohio also has a critical shortage of healthcare providers.

Purpose

- To quantify the associations between diabetes prevalence and incidence in Ohio counties, considering various factors that impact health and quality-of-life outcomes.

Methods

The data were obtained from the United States Diabetes Surveillance System (USDSS) for all 88 counties in Ohio

Pearson correlation tests were employed to investigate the relationship between diabetes and social determinants of health

A t-test and multivariate analysis of variance (MANOVA) test were performed to analyze the disparities between Appalachian and non-Appalachian counties

Results

Social Determinant	Diabetes Prevalence	
	Correlation Coefficient (r)	P value
Children in Poverty	0.57	<0.001*
Food Insecurity	0.54	<0.001*
Primary Care Physicians	0.18	0.088
No Health Insurance	0.14	0.21
Overall Socioeconomic Status	0.49	<0.001*
Overall Minority Status & Language	-0.075	0.49

Table 1. Impact of social determinants of health on diabetes prevalence for Ohio counties.
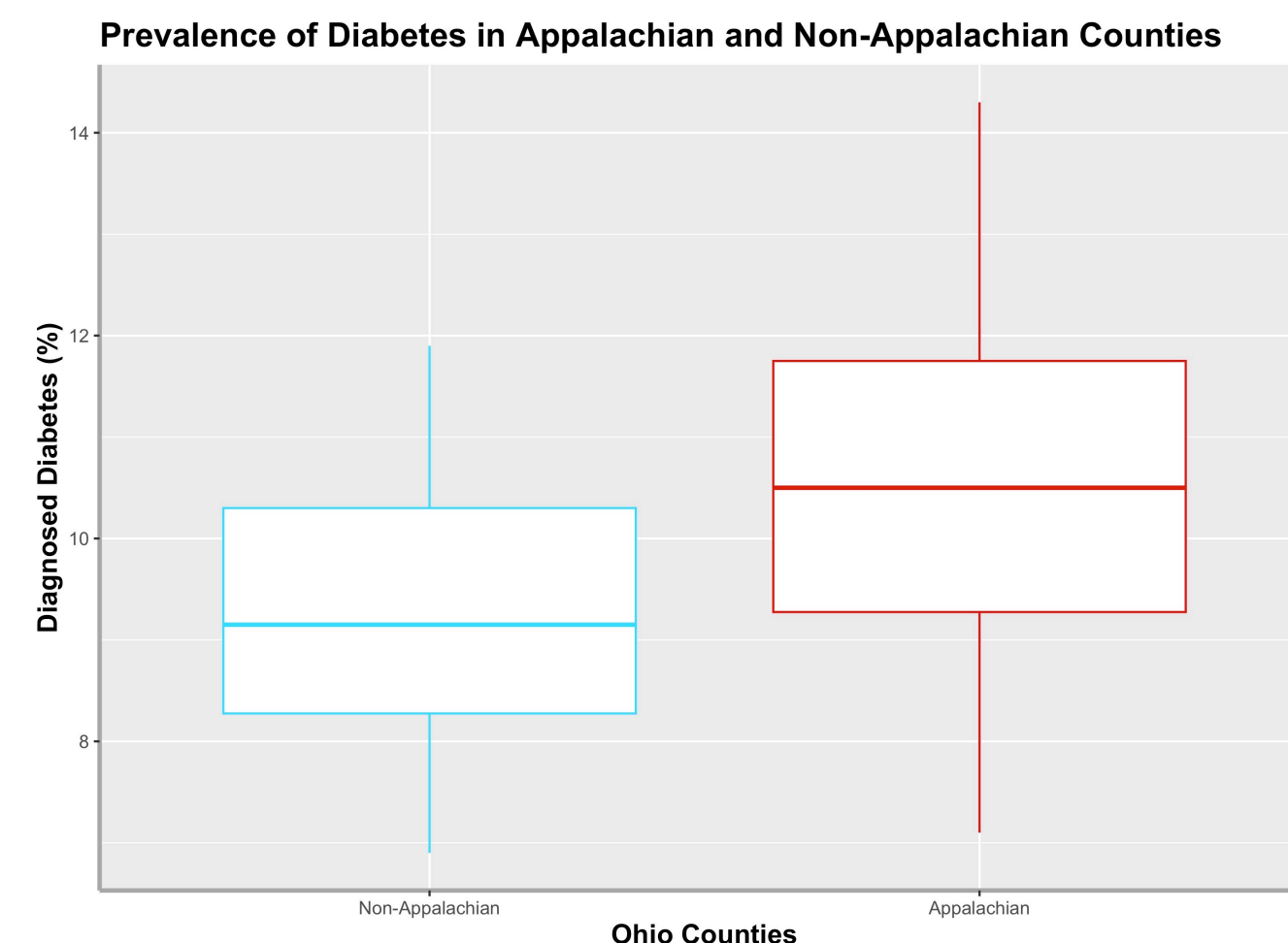
Social Determinant	Diabetes Incidence	
	Correlation Coefficient (r)	P value
Children in Poverty	0.39	<0.001*
Food Insecurity	0.4	<0.001*
Primary Care Physicians	-0.18	0.1
No Health Insurance	0.14	0.2
Overall Socioeconomic Status	0.36	<0.001*
Overall Minority Status & Language	-0.3	<0.05*

Table 2. Impact of social determinants of health on diabetes incidence for Ohio counties.
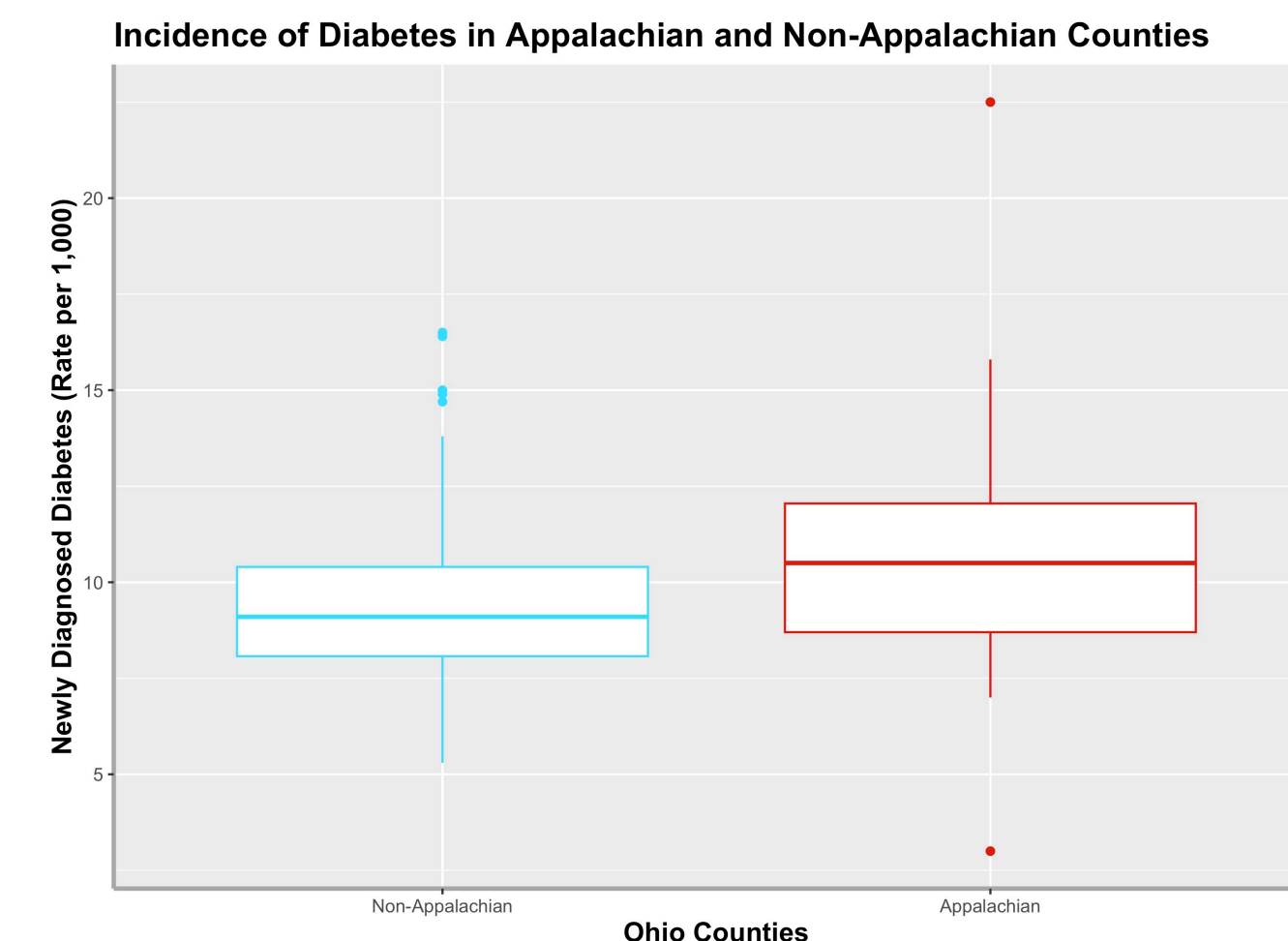
Social Determinant	P value	MANOVA	
		$F_{1,85}$	P value
Children in Poverty	<0.001*		
Food Insecurity	<0.001*		
Primary Care Physicians	0.025*		
No Health Insurance	0.0008*	~ 11.5	<0.001
Overall Socioeconomic Status	<0.001*		
Overall Minority Status & Language	<0.001*		

Table 3. Comparison of social determinants of health between Appalachian and non-Appalachian counties in Ohio

Figure 1. Comparison of diabetes prevalence between Appalachian and non-Appalachian counties in Ohio ($P<0.001$, α=0.05).

Figure 2. Comparison of diabetes incidence between Appalachian and non-Appalachian counties in Ohio ($P=0.11$, α=0.05).

Conclusion

- These findings suggest that Appalachian counties may face a disproportionate impact from health-related factors and experience limited access to healthcare services.
- The data highlight the need for focused efforts to address the specific challenges faced by Appalachian counties.
- Improving access to healthcare services in the Appalachian region is paramount to ensure equitable healthcare and enhance the overall health outcomes of affected communities.

References

1. CDC. National Diabetes Statistics Report. Centers for Disease Control and Prevention. Published June 29, 2022. Accessed May 26, 2023. https://www.cdc.gov/diabetes/data/statistics-report/index.html.
2. Beverly EA, Ritholz MD, Cook K, et al. Diabetes in Appalachia: providers' perspectives. Prim Health Care Res Dev. 2020;21:e11. Published 2020 May 14. doi:10.1017/S1463423620000134
3. United States Diabetes Surveillance System. Diabetes. Centers for Disease Control and Prevention. Published May 13, 2023. Accessed May 17, 2023. https://www.cdc.gov/diabetes/index.html.