1. Abstract

This study explores differences between adult suicide rates in counties in Ohio from 2007-2012, specifically differences between major metropolitan and rural areas. Less densely populated states in the nation have been shown to have the highest rates of completed suicide, and that trend was hypothesized to exist in the least densely populated counties in Ohio. Suicide rates in the three most densely populated counties in Ohio (Cuyahoga, Franklin, and Hamilton) were found to have rates below the national average for adults (12.2 per 100,000). In contrast, seven of the ten least densely populated counties had rates above the average, and the least densely populated county (Ashland) had a rate more than twice as high (26.6 per 100,000) as the average. Several of the least populous counties in Ohio had less than 20 suicides in the sample, so aggregate suicide rates were calculated to obtain stable rates. Although the hypothesized relationship did exist, many factors found to be associated with increased rates of completed suicide were not included in this study. Future studies might include method and distance from emergency and mental health treatment services, as well as more years to compensate for small samples size in less densely populated counties.

2. Methods and Population

Completed suicides in Ohio (n=8,654) were compiled from Ohio death records. Cases were excluded if the deceased age was less than 18 years (n=293) or if there was missing data (n=30) in the record. From the remaining adult suicides (n=8,331), aggregate rates were calculated by county. Population density for each county was calculated based on the 2010 census and unstable rates (n < 20) were excluded, leaving 75 counties in the analysis.

3. Completed Suicides by Population Density

This map shows the counties in Ohio with the largest numbers of completed suicides from 2007-2012. Not surprisingly, these concentrations (shown here in darker shades of green) are most common around population centers. The five darkest areas on the map correspond with the five largest cities in the state, and the surrounding metropolitan areas. However, when rates are calculated the focus shifts away from urban centers, and onto the more rural parts of the state.

In the United States, suicide rates are highest in states with the lowest population density. For example, the three least densely populated states (Wyoming, Alaska, and Montana) also have the three highest suicide rates. Wyoming has a rate of 21.36 per 100,000, Alaska 23.07 per 100,000, and Montana 23.37 per 100,000. 2,3

The three most densely populated counties in Ohio (Cuyahoga, Franklin, and Hamilton) all have rates that fall below the national average rate for adults (12.2 per 100,000). In contrast, Morgan county has a rate of 26.6 per 100,000 which is more than double the national average. Morgan county is itself rural (15,000 in 2010), and bordered almost entirely by other rural counties. With 36 people per square mile, it is one of the least populous parts of the state.

The map on the right, shows rates for the 10 counties with the highest stable rates of suicide. Seven are in rural counties, and the three that are not, are in counties that do not border major metropolitan areas. If counties without stable rates are included, all 10 are in rural counties.

Although there are rural counties that have lower rates of suicide, they often border a more densely populated county in Ohio (e.g. Scioto county in close to Portsmouth, OH), or are in close proximity to a large city across the border in another state (e.g. Lawrence county is across the Ohio river from Huntington, WV). States with the lowest rates of suicide are almost entirely in northern Ohio, which is more densely populated and has less vertical relief k=making travel considerably easier.

4. Discussion

The stark differences between suicide rates in Ohio’s most densely populated counties and the rates in many of the most rural counties in the state would seem to indicate a relationship worth exploring further. Although the increase opposite to some classic ideas 1,4, but caution must be exercised before drawing conclusions about the individual motivations behind these acts based on such data. Admittedly, these differences seem to follow other research at the national level 7, and illustrate the need for additional study, but this analysis does not include many potentially spurious factors that could also contribute to these differences.

The farmland of northern Ohio and the rolling hills of the Appalachian plateau are far from blank spots on the map, and yet they share a similarity with the most isolated parts of the United States. The reasons for such similarity deserve attention if the US is to reverse the current rise in suicide rates.

5. Recommendations

These results point to a need for further investigation into the possible reasons for increased rates of completed suicide in rural areas. First, data from additional years is necessary to allow stable rates to be calculated for all counties (13 were excluded from this analysis), and similar work could be done for counties in other states (most and least densely populated).

Future research could also examine access to behavioral health services in rural areas and proximity to emergency health services. Others areas to consider might include addressing access to firearms (overwhelmingly the most common means of completing) in rural areas.

6. References