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Chlamydia in Ohio 2019

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Population and Public Health

Scholarship in Medicine Final Report

Abstract

Objective: Chlamydia Trachomatis is becoming an increasingly large national problem with severe consequences on the medical health care system. *Methods:* With data collected from County Health Ranking, with research that has been conducted at governmental and nongovernmental levels throughout the community, state and national level. Increases in rates of chlamydia can be linked to an increased number of testing or increased accuracy of testing while decreased numbers of incidence can be due to low reporting from that county. Conducting correlation and comparison may reveal additional links to the rising rates of Chlamydia. *Results:* We found a positive correlation between rate of chlamydia and percent access to exercise opportunities as well as a positive comparison between 2016 and 2019 rates of Chlamydia in Ohio. No correlation was found between rates of chlamydia and insufficient sleep.

Key Words: Chlamydia, Exercise, Access, Ohio, 2019

Introduction/Literature Review

Chlamydia Trachomatis is a genital tract infection with numerous consequences that poses an increasingly large problem in America. As the fastest growing sexually transmitted infection in the United States, over 1.4 million reported new cases each year, the complications are also increasing.¹ The rates of infection are greatest for sexually active, non-Hispanic black females which is nearly five times the prevalence among non-Hispanic white females.^{2,3} Pelvic Inflammatory disease, postpartum endometritis and tubal infertility are some of the most common sequelae with management cost per case ranging from 163 dollars to 6,752 dollars.⁴ Ohio began to increase measures to prevent the spread of these infections with the passage of expedited partner therapy in 2016.⁵

Researchers have found a substantial range in cost per case of chlamydia. Differing management, perspectives of disease process and different screening tests all influence the potential cost of care for untreated Chlamydia Trachomatis infection.^{4,6} Chlamydia is responsible for almost half of the sexually transmitted infections in people ages 14-24, but testing of this population group is extremely low.^{2,3,6} The infection can be symptomless which leads to problems such as pelvic inflammatory disease, post-partum endometritis, infertility and adverse birth outcomes which cost over 15.6 billion dollars annually.^{4,7} In 2019, randomly testing about 300 college students from three different universities showed an unknown chlamydia infection rate of 5.8% in the specified population.⁷

A lot of research has been done on chlamydia, both in its acute treatment as well as treatment and cost of its complications. However, the correlation between increase incidence of chlamydia infections and access to exercise opportunities as well as the correlation between incidence of chlamydia and insufficient sleep have been relatively unexplored. If a negative correlation exists between the rate of chlamydia and access to exercise opportunities a case could be made for increasing exercise opportunities for teenagers in cities with uncontrollable rates of STIs. With hundreds of thousands of health care dollars spent on treating infections and sequelae spending a

few thousand dollars on playground equipment to decreased neighborhood rates could financially benefit a lot of cities. The possibility of a decreased rate of chlamydia infections and the subsequent sequelae for the cost of increased access to exercise possibilities poses an interesting quandary.

Research Questions

RQ 1: What is the correlation between the rate of chlamydia and percent access to exercise opportunities in 2019 Ohio?

RQ 2: How do the rates of chlamydia change from 2016 to 2019 in Ohio?

RQ 3: What is the correlation between insufficient sleep and rate of chlamydia in 2019 Ohio?

Methods

Context/Protocol

Data collected on Chlamydia infections in Ohio 2019 was provided by the National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention. Data collected on Rates of Access to Exercise Opportunity was provided by The Business Analyst. Access to exercise was measured as the percentage of individuals who live reasonably close to a location for physical activity via a census. The 2019 County Health Rankings used data from 2016 for both of these measures. Insufficient sleep information was provided via the Behavioral Risk Factor Surveillance System and was measured based on survey of adults who reported less than 7 hours of sleep a night on average. Research was collected with governmental and nongovernmental partners at the community, state and national levels. Data collected for Chlamydia infections showed information on all peoples who are sexually active within Ohio Counties for 2019.

Data Collection

An increase in the number of reported cases could be due to increased incidence of disease by may also show an increase use of testing or increase sensitivity of the diagnostic tests. Rates

of Chlamydia in a given county were measures by the number of events divided by the average number of people who were at risk during the same time period. Communities with poor screening rates have the possibility of incorrectly low rates of chlamydia incidence. Data was excluded for counties with few than 4 cases in the given time frame.

Data Analysis

We conducted a Pearson correlation with the rate of chlamydia as our dependent variable and percent access to exercise opportunities as our independent variable in 2019 Ohio to answer RQ1.

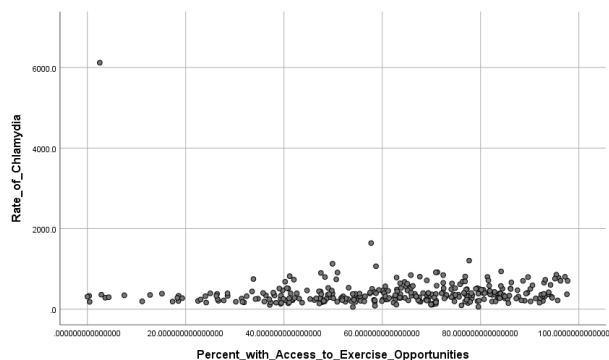
We conducted a paired sample t-test between the rates of chlamydia in 2016 as compared to 2019 in Ohio to answer RQ2.

We conducted a Pearson correlation with the rate of chlamydia as our dependent variable and insufficient sleep as our independent variable in 2019 Ohio to answer RQ3.

Results

For research question 1 we are correlating rate of chlamydia with percent access to exercise opportunities. A Pearson correlation showed a significant correlation of $p=.001$ and an r value of .83 where as the percent access to exercise opportunities increases the rate of chlamydia also increases.

Figure 1: Correlation Between Rate of Chlamydia and Percent Access to Exercise Opportunities in Ohio 2019



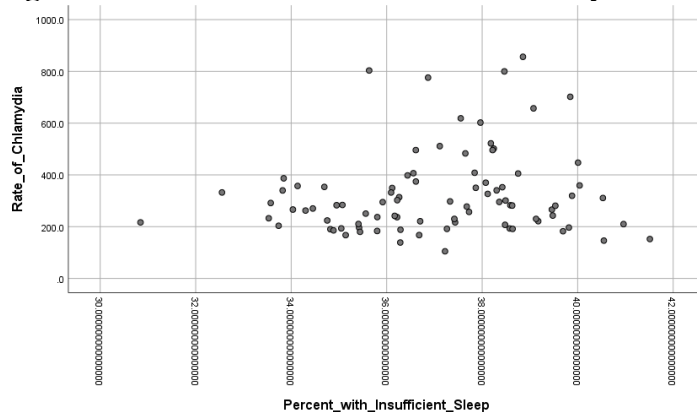
For research question 2 we are comparing the rate of chlamydia between Ohio counties in 2016 and 2019. We found that the prevalence significantly increased from 282 in 2016 to 324 in 2019 with $p<.001$. (Table 1).

Table 1: Rate of Chlamydia in Ohio

| Year | n | Mean | SD |
|------|----|------|-------|
| 2016 | 88 | 282 | 135.7 |
| 2019 | 88 | 324 | 159.7 |

Statistically significantly different from 2016 ($p < .001$)

For research question 3 we are correlating rate of chlamydia with insufficient sleep. A Pearson correlation showed that there was no significant correlation between the rate of chlamydia and insufficient sleep in Ohio 2019 with an r value of .27 and a $p > .05$. (Figure 2).

Figure 2: Correlation Between Rate of Chlamydia and Insufficient Sleep in Ohio 2019

Discussion

My results found that there was a positive correlation between rate of chlamydia and percent access to exercise opportunities in Ohio 2019. There was also a statistically significant difference between rates of chlamydia in Ohio 2016 and 2019 that showed rates of chlamydia have been increasing over the course of three years. The results showed no correlation between rates of chlamydia and insufficient sleep in Ohio 2019.

As previous data has shown, rates of chlamydia over the past several decades has been steadily increasing despite efforts to slow the progression.^{1,8} With increasingly concerning sequelae including but not limited to infertility, PID and ectopic pregnancy foremost among them, chlamydia has become a large concern in the health care field.¹ With the consequences of

chlamydia increasing steadily the cost to the health care field is increasing exponentially as well.⁸ Cost analysis of the benefit of testing high risk, asymptomatic patients showed an average cost of \$22 per person, with roughly 300,000 additional people treated each year.^{4,6}

With findings correlating percent access to exercise opportunities and rates of chlamydia this gives an opportunity to find and test high risk young adults in the community. The decrease of the spread of the initial disease with asymptomatic patients being treated before additional sequelae can lead to high cost treatments would save hundreds of thousands of dollars for the health care system. The unencumbered increase of chlamydia has become a national concern and all efforts to decrease the spread as well as decrease cost to the system should be considered.

Conclusion

One of the important limitations of this paper is that the reported infections of chlamydia may reflect true increases in the disease but could also be reflective of expanded screening opportunities in the individual counties. With an increased emphasis on this case reporting from individual labs and providers we have improvement in the system. On the other end counties with low rates of chlamydia could be artificially low due to low reporting rates. Discussions for the future directions of this project could be additional correlations between rates of chlamydia and additional factors to decrease the number of asymptomatic persons needed to be tested.

While the cost of treating ectopic pregnancies can reach upwards of \$3,000 per patient the cost of testing asymptomatic patients is still one the health care system can ill afford; finding a niche of people to test to decrease the amount of people tested to decrease the average cost per person seems a reasonable solution. With the positive correlation between chlamydia and percent

access to exercise opportunities, testing high risk, young adults who frequent places of physical fitness would be a good place to start.

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