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Secondary Analysis of Sexual Health of Young Adults in Kalamazoo and Jackson County: Gonorrhea

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Secondary Analysis of Sexual Health of Young Adults in Kalamazoo and Jackson: Gonorrhea

In 2011, there were 321,849 cases of gonorrhea reported in the United States (CDC, 2013). The rates indicate that there were 104.2 cases per 100,000 populations within that year (2013). Among the United States, the mid-west region had the second highest rates of gonorrhea reported throughout the entire United States that same year (2013). Within the nation, Michigan was ranked eleventh for the highest rates of gonorrhea cases reported (2013). For the purpose of this thesis, these statics verify that gonorrhea is a current problem in the United States, the mid-west region and Michigan. The age group of 15-19, 20-24 and 25-29 represent the highest rates of gonorrhea infections (2013). The college age student is represented within all three of the high risk age groups. In brief, the purpose of this paper is to provide evidence that an education program needs to be implemented in college campuses in order to reduce gonorrhea rates.

Literature Review

Healthy People 2020 (2013) is a nationwide government organization that strives to improve the quality of life of American citizens. It aims health goals toward health-promotion and disease-prevention. Currently, Healthy People 2020 has several goals aimed at reudicng gonorrhea. This study was based off of the Healthy People 2020 goals regarding sexual health behaviors. The overall goal stated is to reduce the proportion of gonorrhea infections among males and females ages 15-44.

According to an article by Lechner et al. (2013), sixty-four percent of high school seniors report being sexually experienced (p. 28). Of this population, twenty-nine percent reported the lack of use of condoms (2013). According to the CDC (2013), the higher prevalence among adolescents and young adults of STDs may indicate barriers such as lack of access. Many

colleges and universities prioritize other topics such as influenza and responsible alcohol consumption, over sexual health (Lechner et al., 2013). In fact, in 2009 only 52.5% of college students reported receiving information from their college regarding sexually transmitted infections (Lechner et al., 2013). This indicates that before students start college they are considering themselves "sexually experienced" and are not protecting themselves even before attending college.

According to Trieu et al. (2011), 59% of the 18 million United States college students are between the ages of 18-24 (p. 744). In regards to this study, the focus is on ages 20-24 due to one-third of new cases of gonorrhea occurring among this age group (Lechner et al., 2013). This could be related to the high-risk sexual behaviors such as use of alcohol, multiple and frequent partner changes, and lack of use of condoms that occurs much frequently in this age group (2011).

The literature reveals that many college-aged students are not getting tested for sexually transmitted infections. The Journal of American College Health (Moore, 2013) states that the cases of Human Immunodeficiency Virus, Chlamydia, and gonorrhea may be even higher than what is reported due to the lack of screening among college students (2013). According to the Center for Disease Control (2013) the main reason for not getting tested is perceived lack of risk for infection. A qualitative study (Moore, 2013) investigating why students would not get tested for sexually transmitted infections in general found that perceived negative consequences of getting tested were significant barriers. A majority of students worried about what others would think and embarrassment and small number being fearful of procedures. Overall, participants seemed to believe that they personally had low risk for contracting HIV or STIs. The most frequent reason for a lack of motivation to get tested in the near future was a belief that one was

not at risk (2013). The reasons most often selected by participants for lack of motivation for being tested was believing they were not at risk, followed by those who were recently tested, and then those who stated that their partner had been recently tested, so they did not feel the need. A few were afraid that someone they know might see them get tested. Others were unfamiliar with the testing process (2013).

Individuals who reported currently using condoms were less likely to have ever been tested for Chlamydia or gonorrhea this is within line with other research that found that students who seek testing tend to be those engaging in unprotected sex (Moore, 2013). This may suggest that students using condoms perceive that they are taking proper precautions using condoms and see less of a need to get tested, although they indicated a motivation to get tested in the future (2013). With condoms being considered one of the most effective behavioral strategies in reducing contraction of sexually transmitted infections, there is a need for further education regarding this issue (2013). Sexual education in general should be the main focus. If more college students were aware of their local resources, and preventative measures, there may be an increase in screening rates of gonorrhea.

More specifically, gonorrhea is a treatable sexually transmitted infection (STI) caused by the bacterium *Neisseria gonorrhoeae* (CDC, 2013). It is spread through all sexual activity whether it is genital, anal or oral sex and can grow easily in the reproductive tract of both men and women. The bacterium can also affect the mouth, throat, eyes, and anus. Gonorrhea is the second most common STD in the United States and the highest rates of infection are among the sexually active teenagers, young adults, and African Americans (2013).

According to the Center for Disease Control (2013), a major concern with gonorrhea is that it is predominantly asymptomatic and most males and females are unaware they are infected.

More often than females, males appear to be asymptomatic and even if females do experience symptoms, they are often so mild they are mistaken for a different type of infection (2013). The first symptoms in women can include a painful or burning sensation when urinating, vaginal discharge, or vaginal bleeding between periods (2013). If symptoms do occur in males they usually consist of burning while urinating, or a white, yellow, or green discharge. Painful or swollen testicles are also common in males. If symptomatic, symptoms will present themselves one day to two weeks after being infected with gonorrhea. In both men and women, a rectal infection may include discharge, anal itching, soreness, bleeding, or painful bowel movements and infections in the throat may cause a sore throat (2013).

Complications

Even if asymptomatic, gonorrhea can lead to severe consequences in both males and females—if left untreated (CDC, 2013). More consequently for women, they increase the risk of pelvic inflammatory disease (PID), becoming infertile, having ectopic pregnancies and suffering from chronic pelvic pain. PID can lead to internal abscesses and may cause severe pelvic pain. PID can damage the fallopian tubes severely and cause a woman to be infertile (2013).

Untreated gonorrhea infections in pregnancy often have severe consequences (CDC, 2013). Infections have been linked to miscarriages, premature birth, low birth weight, premature rupture of the membranes, and an infection found in the amniotic fluid (2013). If a pregnant woman has gonorrhea, she risks passing the infection to her baby as the baby is pushed through the birth canal and can cause serious health problems for the baby. Treating gonorrhea as soon as it is detected in pregnant women will make these consequential health outcomes less likely (2013).

Men with untreated gonorrhea can experience epididymitis and inflammation of the testicles (CDC, 2013). Similar to women, if epididymitis is left untreated it may lead also to infertility. Gonorrhea is also associated with an increase in risk for Human Immunodeficiency Virus (HIV) infection in both males and females (Bull, 2000).

Economic Impact

The economic impact of gonorrhea is a major struggle at the national, state and local level of healthcare. The cost of STIs to the U.S. health care system is estimated to be as much as $15.9 billion annually because most cases of STIs go undiagnosed and lead to much more severe complications (CDC, 2010). Overall, STIs place a significant impact on the United States healthcare system economically. In 2010, the Center for Disease Control and Prevention estimated that the lifetime cost of treating the most common STIs in just one year is $17 billion. Beyond that estimation, it has the potential to cost individuals even more for a consequential form of any STI, whether it has an immediate or life-long consequence. The annual cost of all the curable STIs is roughly $742 million (2010).

Additionally for women, gonorrhea can progress to pelvic inflammatory disease (PID). PID is both a dangerous and costly condition and it is estimated that treatment for a single case can costs anywhere from $1,060 and $3,180 (Campbell, 2011). At the state and local level, the total Local Public Health Operations funds for 2008–09 was $5.7 million distributed to each local health departments for STI screening in Michigan alone with Kalamazoo County Health Department included (2010).

Screening

Any sexually active person can be infected with gonorrhea whether they are presenting symptoms or not (CDC, 2013). If symptoms occur or a sexual partner is displaying symptoms of

gonorrhea, both sexual partners need to be tested immediately (2013). Because gonorrhea frequently has no extremely common to be asymptotic, screening is important even beyond symptoms and is critical for early detection and control (Steiner, 2003). It is recommended to get tested seven to ten days after a sexual encounter with someone whose STI status is uncertain. All sexually active patients should discuss their risk factors with a health care provider and determine whether he or she should be tested for gonorrhea or any other STIs (2013). People who have gonorrhea should also be tested for additional STIs, such as HIV and Chlamydia (2013).

Most screening for gonorrhea consists of a non invasive urine sample, if the patient has not urinated within the last hour of the visit (CDC, 2013). If the patient is symptomatic, the screening process can consist of a discharge sample. If asymptomatic, the screening process can consist of a swab of the penis, rectum, or vagina to test for the presence of bacteria in each area. If a person has had different types of sexual activity, an oral or anal swab may be collected as well (2013).

Treatment

Bacteria causing sexually transmitted infections are both preventable and curable. With the proper treatment patients will have minimal complications (Bull, 2000). For the control of gonorrhea, an antimicrobial drug is effective in 95% or more of cases, if treated early enough (Torpy et al, 2013). If a person has been diagnosed and treated for gonorrhea, he or she should tell all recent anal, vaginal, or oral sex partners so they can receive the necessary treatment to stop the spread of the infection (2013). This will reduce the risk that the sex partners will develop serious complications from gonorrhea and will also reduce the person's risk of becoming re-infected. A person with gonorrhea and all of his or her sex partners must avoid having sex until

they have completed their treatment for gonorrhea and until they no longer have symptoms (2013).

Currently, the treatment for gonorrhea is Ceftriaxone (250 mg IM)/Cefixime (400 mg) taken one time orally (Torpy et al, 2013). If contraindicated, an intramuscular injection of Cephalosporin can be given with an option of two additional oral medications. The first option is Azithromycin (1g) in a single dose. The second option is Doxycycline (100 mg) can be taken for seven days. The Doxycycline has much less adherence because it is taken for an entire week (2013). More complicated cases of gonorrhea must be treated case specifically and may additional treatment.

Treatment-Resistant Bacterium

Research indicates that gonorrhea treatment is becoming complicated. It is recently become problematic that the bacterium, *Neisseria gonorrhoeae,* which causes gonorrhea, is developing resistance to treatment options (CDC, 2013). Broad spectrum antibiotic-resistant *Neisseria gonorrhoeae* strains are now widely circulating throughout the United States and potentially the entire world (2013). Within the last five years, broad spectrum antibiotics are no longer recommended nationally for treatment of gonorrhea. Currently, Cephalosporin's are the only treatment option that is being recommended (2013). Decreased receptiveness of *Neisseria gonorrhoeae* to Cephalosporins and other treatments is predicted to continue to spread due to the increase of gonorrheal infections nationally and globally (2013).

The state and local observation for antimicrobial resistance is critical regarding therapy recommendations (Kalamazoo County Health and Community Services, 2013). Clinicians who diagnose gonorrhea infections and suspect a resistant form must identify the health department (2010). With any treatment failure, a culture and susceptibility testing of specimens must be

conducted and each resistant case needs to be reported to the CDC. Health departments need to prioritize partner notification and contact patients linked to any treatment failures (2010).

Method

The method of this thesis was to conduct a secondary analysis regarding the prevalence of gonorrhea in both Kalamazoo and Jackson County. The goal was to obtain concrete evidence in order to help support the need for a sexual health educational intervention designed specifically for college students at Western Michigan University (WMU) regarding reducing gonorrhea infections. Kalamazoo County was compared to Jackson County, due to the similarities in demographic break down. The main difference between the two counties is that Kalamazoo has a university, whereas Jackson County simply does not. By comparing these two counties with similar demographics, the prediction was that there will be a significant difference in reported cases of gonorrhea in Kalamazoo County due to a university being present. The findings would serve as the necessary evidence that more education needs to be implemented for the students that attend this university.

The primary focus of this study is to reduce gonorrhea rates through education among both males and females aged 20-24 in Kalamazoo County. The targeted age group was 20-24 because young adults account for one of the highest rates of gonorrhea, nationally. Also, it is an age group that accounts for a large portion of the students attending WMU with a few exceptions. The age group of 15-19 and 25-29 were also compared in Kalamazoo and Jackson Countries to evaluate a potential trend in infection cases reported. An Institutional Review Board (IRB) approval was not necessary for this study because it was a secondary analysis and did not use participants, but instead focused on public data that was previously collected by the Michigan Department of Community Health.

The overall purpose of this thesis is to provide the necessary evidence that a sexual health education intervention needs to be implemented into the campus of WMU in hopes to reduce the rates of gonorrhea among college students aged 20-24.

County Comparisons

Demographics

In comparing the demographics among Kalamazoo County and Jackson County the findings indicated both differences and similarities among the counties. In table 1, the population difference between Kalamazoo and Jackson is approximately 90,000 additional people. Kalamazoo County presents more females than males, whereas Jackson County presents more males than females. Table 1, represents the percent break down of each ethnicity which are fairly similar. Both Kalamazoo and Jackson County are primarily Caucasian communities. Kalamazoo, however, does have a much larger African American community than Jackson County which may be because of the increased population. In Kalamazoo, ages 20-24, there is a 20,000 population difference compared to Jackson.

Table 1
Demographics: Kalamazoo vs. Jackson (2010)

	Kalamazoo County (2010)	**Jackson County (2010)**
Males	122,757	81,710
Females	127,902	78,538
Total population	250,659	160,248
White	204,644 (81.6%)	140,507 (87.6%)
Black	27,266 (10.8%)	12,739 (7.9%)
American-Indian or Alaskian Native	1,059 (.4%)	592 (.3%)
Asian or Pacific Islanders	5,212 (2%)	356 (.2%)
Native Hawian or Other Pacific Islander alone	88	33
Some other race alone	3,815	1,224
Two or more races	8,247	4,016

(United States Census, 2013)

Characteristics

Both counties compared are located within the West Michigan area. Kalamazoo County is approximately 66.80 miles from Jackson County. The largest difference between Jackson County and Kalamazoo County are the two universities and community college that are present in Kalamazoo County. Western Michigan University, Kalamazoo College and Kalamazoo Valley Community College are all located within Kalamazoo County and potentially contribute to the overall total population. Jackson Community College is located within Jackson County and contributes to the population of Jackson County slightly because majority of students attending a community college typically reside in that county.

The students that attend the university or community college are not necessarily from Kalamazoo or Jackson County, but have the potential to be counted in the United States census regarding the total population of either county. The United States census states that an individual is counted in the census of that county if they live or stay within that city/county for majority of the calendar year (United States Census, 2012). This indicates that majority of college students should be counted at their college address and not necessarily what their state license indicates. This, however, is not always the case. Students attending universities have several barriers associated with being counted in the United States Census. Some students always claim their "home town" as their address, whereas other students may not. Because most students move several times during their college career, they rarely change the address on their driver's licenses. Out of town students, who do not reside in Kalamazoo or Jackson County, ideally should add drastically to the individual county, but it is unable to indicate how accurate the population count is in a county where any college is located. It is uncertain if this protocol gets carried out accurately and the United States census has a desire to improve the population census by

implementing better protocol for counting college students in the city they live for most of the calendar year (2012).

Table 2 indicates that Western Michigan University alone brings in an average of 25,000 students a semester which may, or may not, add drastically to the population of Kalamazoo (Western Michigan University, 2012). Table 3 indicates that Western Michigan University brought in the largest amount of students when compared to Kalamazoo College and Kalamazoo Valley Community College (Kalamazoo College, 2012, Kalamazoo Valley Community College, 2012, Western Michigan University, 2012). Table 3 shows that Jackson Community College brought in the least amount of students when compared to the other three colleges (Jackson Community College, 2012).

Table 2
Population of Western Michigan University (2012)

Total Students	24,598
Males	11,857
Females	12,741
Minorities	4,638
Michigan	21,741
Other States	1,282
Other Countries	1,575

(Western Michigan University, 2013)

Table 3
Student Population at Western Michigan University, Kalamazoo College, Kalamazoo Community College and Jackson Community College (2012)

	Western Michigan University	**Kalamazoo College**	**Kalamazoo Valley Community College**	**Jackson Community College**
Total Students	24,598	1,348	11,395	8,186

(Western Michigan University, 2012), (Kalamazoo College, 2012), (Kalamazoo Valley Community college, 2012), (Jackson Community College, 2012)

Education

According to the United States Census Bureau (2012), the most recent data provided on population of youth in Kalamazoo is from 2010. At that time there were approximately 16,594 youth ages 16-19 living in Kalamazoo County. Only about 278 or 1.7% of that population were not enrolled in school or working, or have a high school diploma. The only additional data that could be obtained regarding education for those living in Kalamazoo County is for the population 25 years and older.

For Jackson County, the only information that could be found regarding education in Jackson County was for ages 25 and older. Therefore, the targeted age population that is being are looking at from 20-24 had no information provided for either county.

Poverty

Poverty is a major issue within the state of Michigan, specifically Kalamazoo County. From 2008-2010 Kalamazoo County had an average of 19.2% of residents that fell below the Federal poverty guidelines, see Table 4 (Kalamazoo County Health and Community Services, 2012). From 2008-2010 it was estimated that 47.7% people between the ages of 18-24 lived below the poverty line in Kalamazoo (2012). The age group of 18-24 had the highest percentage of people living below the poverty level when compared to all the other age group in Kalamazoo County (2012). Additionally, it was identified in Kalamazoo in 2010 that 35.8% of African Americans lived below the poverty line whereas only 12.9% of Caucasian lived below the poverty line for that same year (Kalamazoo County Health and Community Services, 2010).

There was minimal information regarding poverty in Jackson County. Table 4 indicates that an average of 15.7% of the total population lived below the poverty line in Jackson County from 2007-2011 (United States Census, 2013).

Table 4
Average Population of People Living Below the Poverty Line Kalamazoo/Jackson County

	Kalamazoo (2008-2010)	Jackson (2007-2011)
Percentage	19.20%	15.70%

(Kalamazoo County Health and Community Services, 2010 & United States Census, 2011)

Analysis

The data presented in the Tables 5,6 and 7 represent rates of gonorrhea infections. The rates are equalized in order to best compare unequal population denominators. The focus age group of the study was college students ages 20-24. Rates in Kalamazoo have followed a trend similar to the state of Michigan up until 2001 (MDSS, 2012). From 2001 to 2011 the county rates were significantly higher than state rates (2012). The current rate in Kalamazoo County is similar to the rate in Michigan (2012). Based on Table 5, Kalamazoo presented the highest rates in both males and females in the age group of 15-19 whereas Jackson County presented the highest rates of gonorrhea in males and females in the age groups of 20-24. In Kalamazoo County the highest rate was among the 15-19 age group for females and was drastically higher than the rates for males in the same age group. The age group of 20-24 presented the second highest rates of gonorrhea infections among females whereas the age group of 25-29 presented the second highest rates of gonorrhea infections among males. In Jackson County, among the age group of 20-24 males presented the highest rates. Among the age group of 20-24 males presented the highest rates of infections. The second highest age group was 15-19 for both males and females.

Table 5
Gonorrhea Rate in Kalamazoo vs. Jackson County per Age group (2011) per 10,000

	Kalamazoo		Jackson	
Age	**Males**	**Females**	**Males**	**Females**
0-14	0%	0%	0%	0%
15-19	**37.2%**	**94.5%**	24.2%	30.6%
20-24	26.9%	46.2%	**45.5%**	**36.7%**
25-29	33.1%	32.5%	21.2%	26.5%
30-44	18.4%	8.0%	6.1%	6.1%
45+	4.7%	0%	3.0%	0%

(Michigan Department of Community Health, 2013)

Although the age group of 20-24 was the targeted population, it was imperative to include the breakdown of the age group 15-19 and 25-29 from 2001-2011 because both groups were identified as a high risk population in either Kalamazoo or Jackson County. Focusing on the 15-19 age group, Table 6 indicates that in both Kalamazoo and Jackson females had the highest rates of gonorrhea ages in every year from 2001-2011. Among the age group of 15-19 females presented the highest rates in 2008 whereas males presented the highest in 2009 in Kalamazoo County. The year that presented the lowest rates among females were in 2005 and among males were in 2001in Kalamazoo County. The lowest rates are within 18% of the highest rate presented in both males and females. In Jackson County among the age group of 15-19 females presented the highest rates in 2005 whereas males presented the highest in 2011. The year that presented the lowest rates among females were in 2005 and among males were in 2001. The year that presented the lowest rates among females were in 2011 and among males were in 2004 in Jackson County. The lowest rates are within 15% of the highest rate presented in both males and females. The biggest problem exists among females in Kalamazoo County in the year 2008. The most recent statistic indicates that females in Kalamazoo County had the highest rates of gonorrhea infections.

Table 6
Prevalence of Gonorrhea among Females and Males Kalamazoo vs. Jackson 2001-2011, Ages 15-19 per 100,000 Population

Year	Kalamazoo		Jackson	
	Females	**Males**	**Females**	**Males**
2011	44.6% (91)	25.2% (37)	30.6% (15)	**24.2% (8)**
2010	35.8% (97)	29.6% (63)	28.8% (15)	18.5% (5)
2009	37.1% (127)	**30.3% (73)**	35.0% (36)	26.1% (12)
2008	**45.2% (180)**	24.2% (76)	37.4% (71)	21.1% (23)
2007	40.9% (103)	23.4% (46)	37.5% (90)	22.8% (31)
2006	32.5% (104)	14.1% (36)	43.9% (93)	18.1% (21)
2005	28.6% (86)	24.9% (56)	**44.2% (102)**	21.9% (30)
2004	38.6% (132)	15.1% (35)	37.3% (90)	9.6% (15)
2003	36.0% (109)	15.8% (43)	44.3% (81)	13.9% (15)
2002	34.2% (69)	17.1% (34)	40.8% (89)	20.8 (26)
2001	32.8% (94)	11.6% (27)	40.1% (71)	18.6 (18)

(Michigan Department of Community Health, 2013)

Focusing on the 20-24 age group, Table 7 indicates that in Kalamazoo females had the highest rates of gonorrhea ages in every year from 2001-2011. Jackson County had a slightly different trend in rates. In Jackson County females have the highest rates in majority of the years with the exception of males having higher rates in 2003, 2006, 2010 and 2011. Among the age group of 20-24 females presented the highest rates in 2001 whereas males presented the highest in 2007 in Kalamazoo County. The year that presented the lowest rates among females were in 2003 and among males were in 2005 in Kalamazoo County. The lowest rates are within 15% of the highest rate presented in both males and females. In Jackson County among the age group of 20-24 males and females presented the highest rates in 2010. The year that presented the lowest rates among females were in 2003 and among males were in 2001. The year that presented the lowest rates among females were in 2011 and among males were in 2009 in Jackson County. The lowest rates are within 30% of the highest rate presented in both males and females. The biggest problem exists among males in Jackson County in the year 2008. The most recent statistic indicates that males in Jackson County had the highest rates of gonorrhea infections.

Table 7
Prevalence of Gonorrhea among Females and Males Kalamazoo vs. Jackson 2001-2011, Ages 20-24 per 100,000 Population

Year	Kalamazoo		Jackson	
	Females	**Males**	**Females**	**Males**
2011	33.8% (69)	28.6 (42)	36.7% (18)	45.5% (15)
2010	33.6% (91)	27.7 (59)	**46.2% (24)**	**51.9% (14)**
2009	34.5% (118)	29.9 (72)	35.9% (37)	21.7% (10)
2008	29.6% (118)	35.4 (111)	36.8% (70)	24.8% (27)
2007	32.9% (83)	**39.1% (77)**	31.3% (75)	26.5% (36)
2006	35.3% (113)	32.8% (82)	24.5%(52)	36.2% (42)
2005	35.5% (107)	25.3% (57)	30.3% (70)	27.0% (37)
2004	30.1% (103)	37.1% (86)	34.9% (84)	27.4% (43)
2003	29.4% (89)	27.9% (76)	26.8% (49)	45.4% (49)
2002	31.7% (64)	31. 2% (62)	33.6% (64)	29.4% (42)
2001	**36.9% (106)**	37.5% (87)	33.9% (60)	33.0%89(32)

(Michigan Department of Community Health, 2013)

Table 8 shows the total rates of gonorrhea in Kalamazoo and Jackson County among the target age group of 20-24. Still focusing on the 20-24 age group totals, Table 8 indicates that both counties presented high rates of gonorrhea every year from 2001-2011. Among the age group of 20-24 the highest rates were in 2001 in Kalamazoo County. The year that presented the lowest rates were in 2003 in Kalamazoo County. In Jackson County among the age group of 20-24 the highest rates were presented in 2010. The year that presented the lowest rates were in 2006 in Jackson County. The biggest problem exists among both counties. The most recent statistic indicates Jackson County had the highest rates of gonorrhea infections as of 2011.

Table 8
Prevalence of Gonorrhea Kalamazoo vs. Jackson 2001-2011, Ages 20-24 per 100,000 Population

Year	Kalamazoo	Jackson
2011	34.9%	40.5%
2010	30.9%	**48.1%**
2009	32.6%	31.5%
2008	32.3%	32.7%
2007	35.6%	29.5%
2006	34.2%	28.7%
2005	31.2%	28.9%
2004	32.9%	31.9%
2003	28.7%	33.7%
2002	31.4%	30.9%
2001	**37.2%**	33.6%

(Michigan Department of Community Health, 2013)

Because high rates were also present among the age group of 25-29, it is important to evaluate the data and determine trends. Focusing on the 25-29 age group, Table 9 indicates that in Kalamazoo males had the highest rates of gonorrhea ages in every year from 2001-2011. In Jackson County males have the highest rates in majority of the years with the exception of females having higher rates in 2010. Among the age group of 25-29 females presented the highest rates in 2006 whereas males presented the highest in 2003 in Kalamazoo County. The year that presented the lowest rates among females were in 2009 and among males were in 2007 in Kalamazoo County. The lowest rates are within 5% of the highest rate presented in both males and females. In Jackson County among the age group of 25-29 males and females presented the highest rates in 2010. The year that presented the lowest rates among females were in 2003 and among males were in 2009. The year that presented the lowest rates among females were in 2009 and among males were in 20011 in Jackson County. The lowest rates are within 20% of the highest rate presented in both males and females. The biggest problem exists among males in

Jackson County in the year 2009. The most recent statistic indicates that males in Kalamazoo County had the highest rates of gonorrhea infections.

Table 9
Prevalence of Gonorrhea among Females and Males Kalamazoo vs. Jackson 2001-2011, Ages 25-29 per 100,000 Population

Year	Kalamazoo		Jackson	
	Females	**Males**	**Females**	**Males**
2011	13.2% (27)	19.7% (29)	13.5% (7)	14.8% (4)
2010	14.8% (40)	16.0% (34)	**26.5% (13)**	21.2% (7)
2009	12.6% (43)	18.7% (45)	10.7% (11)	**32.6% (15)**
2008	15.3% (61)	18.2% (57)	12.6% (24)	21.1% (23)
2007	12.7% (32)	15.7% (31)	20.0% (48)	25.7% (35)
2006	**18.8% (60)**	20.8% (52)	15.1% (32)	21.6% (25)
2005	16.6% (50)	16.9% (38)	14.3% (33)	21.9% (30)
2004	13.5% (46)	18.1% (42)	14.5% (35)	19.7% (31)
2003	15.2% (46)	**22.8% (62)**	15.8% (29)	16.7% (18)
2002	13.9% (28)	20.1% (40)	11.0% (24)	18.4% (23)
2001	15.7% (45)	19.0% (44)	15.3% (27)	16.5% (16)

(Michigan Department of Community Health, 2013)

Discussion

The hypothesis guiding this study was that there would be a higher prevalence of gonorrhea in Kalamazoo County compared to Jackson County. It was also predicted that there would be a steady increase in gonorrhea from 2001-2011. The first hypothesis was incorrect as well as the second hypothesis. It was predicted that the increased population of each college/university was a contributing factor to the higher rates of STIs among the college student age group 20-24, unfortunately this prediction was not supported due to lack of information available and inconsistencies among the United States Census.

The major findings of the study are that gonorrhea rates continue to be reported year after year in both Kalamazoo and Jackson County. The rates in both counties were fairly similar in findings. The overall findings were that within our focus group (20-24) females have higher rates of reported gonorrhea cases than females. It was discovered that Jackson has the highest rates

compared to Kalamazoo, but both counties are problematic. The age group of 20-24 has one of the highest rates of STI's compares to any other age group with the exception of 15-19 in Jackson County for males and females, 15-19 in Kalamazoo for males and 25-29 in Kalamazoo for females. The data indicate that although the data presents no trend within the three age groups evaluated the rates still continue to be reported. These continued reported rates indicate a need for an intervention to reduce the rates of STIs at the college and high school age level.

Overall, Kalamazoo County has a higher population than Jackson County, but regarding demographic breakdown both counties were very similar. They are both predominantly Caucasian and mirrored similar percentages of the population that were other ethnicities. An obvious difference between Jackson County and Kalamazoo County is the two universities and community college that are present in Kalamazoo County. The students that attend these schools contribute drastically to the population, if counted in the census accurately. Majority of college students should be counted at their college address, if they reside there for most of the calendar year. Doctors and other healthcare providers are required to report any case of gonorrhea to the department of public health within the county the STI is diagnosed (Black & Hawks, 2011).

It was predicted that the additional students that attend Western Michigan University that are not originally from Kalamazoo County are represented in the population. It was also predicted that this contributed directly to the increased rates of sexually transmitted infection in Kalamazoo County over the ten-year time span. However, it was discovered that the cases reported were not identified with being a student at WMU. There was no proof that the supported the additional population of students at WMU contributing to an increase of STI cases in Kalamazoo County.

Education is an important factor to consider for this study because lack of education and lower socioeconomic status is associated with an increase in gonorrhea rates (CDC, 2013). Unfortunately, there was no information found regarding education levels for the 20-24 year old age group in either county. It could have been beneficial to see the education levels in both counties for this age group to see if there were any associations between the reported rates and low education levels.

Poverty is associated with poor health outcomes. This study confirmed the poverty problem that is current in Kalamazoo County. However, it did not provide much information regarding poverty in Jackson County. Kalamazoo County had an average of 19.2% and Jackson County had an average of 15.7% of the total population that lived below the poverty line. It is suggested that the large percentage of people living in poverty in Kalamazoo County contributes to the number of cases reported. Additionally, ages 18-24 had the highest percentage of people living below the poverty level than any other age group in Kalamazoo County, which is also the age group with one of the highest reports of STIs. It was also indicated that a much higher percentage of African Americans live below the poverty line compared to any other ethnic group in Kalamazoo. The overall poverty in Kalamazoo is predicted to contribute to the high rates of STIs reported. It is also suggested that poverty may contribute to the age group of 20-24 having higher rates of STIs than most age groups. Lastly, African Americans in poverty may have a direct relationship with the high reports of STIs among African Americans.

From all the data collected over the years in both Kalamazoo and Jackson counties, there is a presence of reported gonorrhea infections in both counties. The rates of gonorrhea continue to be reported each year and remain above 10% per 100,000 population in all cases with the exception of one year where the rate was 9.6% per 100,000 population. According to Darville

(2012), the cases of gonorrhea infections reported may be due to more efficient screening methods and more people getting tested. In 2002, the screening rate for females' ages 16 to 25 using commercial insurance or Medicaid was 29.8%; in 2008, that rate jumped to 44.7% (2012). In just a short period of time, the screening rate dramatically increased. If the number of screening rates continues to rise there will most likely be more reported cases. Eventually, with more people getting screened, and hopefully treated, there should be a decline in reported gonorrhea cases.

An alternative explanation as to why females have a higher rate of STI's than males may be that females are getting tested more often than males because young women use hormonal birth control, which requires regular physician visits. Moore (2013) found that a gynecological visit in the past year was associated with STI screening. There is a possible link between gonorrhea testing and visiting a physician for birth control prescriptions (Moore, 2013). Females are also getting their first pap smear around 18-21, which maybe be an indication for such high rates during the age group of 15-19 and 20-24.

Other reason female adolescents are more susceptible to acquiring an STI than males are due to their anatomy (Augustine, 2010). Adolescence and women in young adulthood have specific columnar epithelial cells—which are sensitive to invasion by sexually transmitted organisms, such as gonorrhea (2010). The cells expand out over the vaginal surface of the cervix, unprotected and as a woman's body progresses her anatomy becomes more protected by mucus with age (2010). For this reason, adolescent females are at greater risk than adolescent males. Also, males may have lower /gonorrhea diagnosis rates because of their lower testing rates compared to females, thus resulting in more undiagnosed cases (Moore, 2013).

There is a correlation between racial and ethnic groups for sexually transmitted infection and other determinants of health such as poverty (Healthy People 2020, 2013). In fact, African American, Hispanic, and American Indian/Alaska Native populations have a higher rate of STIs compared to Caucasians (2013). There is also a correlation between low socioeconomic status and higher STI rates. In low socioeconomic populations, high-risk behavior is common along with compromised access and health-seeking behaviors (2013). Lack of access also presents a major problem. According to Healthy People 2020, groups with the highest rates of STIs are often those from areas that have a lack of access to care (2013).

Young adults tend to be curious on trying new activities. This curiosity often leads to an increase use of drugs and alcohol for this age group. There is no doubt that there is a correlation between alcohol use and engaging in unprotected sex. In fact a qualitative study done by Downing-Matibag & Geisinger (2009), interviewed 71 college students to explore their rationales for sexual risk taking. When asked about concerns regarding contracting an STI during a hook up, only about 50% of the interviewed students thought about this consequence (Downing-Matibag & Geisinger, 2009). One of the main reasons they found that students underestimated their susceptibility to acquiring an STI with these random sexually activities is because they placed trust in their partners (2009). Most of them did not feel comfortable discussing STIs with these partners, but they did think that their partners would tell them if they did have an STI (2009). The problem with this is too many young adults are taking the preventative measures such as condom use when having multiple partners, and many are not getting tested with each new partner. Some of the excuses made regarding lack of use of condoms were that it stopping the activity to put on a condom “ruins the mood” and the students also believed condoms “interfere with sexual pleasure” (2009). One of the main findings from

the study is the lack of knowledge most college students have regarding STIs and protection from contracting them (2009). In fact, of all 71 students interviewed, not one of them was aware that STIs could be transmitted through oral sex (2009). With so many college students sexually active, and STI rates on the rise, it is obvious some education and action needs to take place. Something needs to be done across the United States to see a change.

In an article by Eisenberg et al., they reported that recent college data indicated that among sexually active college students only 66% of males and 56% females reported use of condoms (2012, p. 940). These reports may not represent complete accuracy because young adults may report the use of condoms, but it cannot be known if this is true. There is no evidence that can confirm this data. Reality is, condom use is not always a priority for sexually active college students. Of these college students engaging in risky behavior, 15% of them reported being intoxicated the last time they participated in vaginal, oral, and anal sex (Eisenberg et al., 2012). When entering college, most young adults begin making choices passed on their increased level of freedom. Most are no longer living with their parents or guardians, and are able to make decisions on their own.

Limitations

Overall, the largest limitation is that the information obtained for both Kalamazoo and Jackson County is from 2010-2011. If more recent data was found, it would have been more beneficial for the purpose of this study. There was also a limited amount of information available on education in both Kalamazoo and Jackson Counties. For Jackson, the only information that could be found was for 25 years and older. For Kalamazoo the gap of 20-24 was unreported for. Therefore, no information was found regarding education for the targeted age group of 20-24 in

both counties. Another limitation could be that both counties were Caucasian predominate and lacked ethnic diversity.

Regarding poverty, Jackson County and Kalamazoo County had two different averages for people living below the poverty line. Kalamazoo's average was taken from 2008-2010 and Jackson's average was from 2007-2011. This difference in time spans could be considered a limitation. Also, there was little information regarding poverty in Jackson County.

As far as population, there is little information regarding where a college student counts in the U.S. census. It is understood that the student should count in the population of the city/county they reside in for the majority of the year. However, there is controversy that students may or may not be counted in the population of the city that they attend college in, if their driver license indicates they are from a different city. This is considered a limitation because the population may not be reliable. There were no reliable sources found to indicate if this information holds true. Also, there is no information provided on how many students enrolled at Western Michigan University is originally from Kalamazoo County. This could also be considered a limitation because that information would be valuable for this study.

Recommendations

It is recommended that the newly enrolled freshmen should be required to attend education segment regarding sexual health that was built into their mandatory freshmen orientation. Every single incoming freshman student goes through orientation at Western Michigan University. It usually occurs the month before classes start. During orientation each student should be required to attend a one hour informational session regarding sexual health. This seminar would be conducted by a registered nurse and would provide essential information that students need to keep themselves sexually healthy. The most important aspect of this one-hour seminar would be

the resources available to the student on and off campus. A majority of the incoming students are not from Kalamazoo and lack the knowledge about the resources and services they have available to them. It would also be important to include pertinent information about each sexually transmitted infection and how to take responsibility of one's own sexual health by means of protection.

It is also recommended that the use of text messages as a source of sexual health education could drastically benefit all students at Western Michigan University. Every students enrolled at Western Michigan University would have access to a number that could received text messages regarding sexual health. The text messages would focus on sexual health questions that students may have. A group called "sexual health peer educators" at Western Michigan University would be an ideal group to manage this education intervention. They are students enrolled at Western Michigan University trained by nurses on sexual health. The text messages would go to a general website login that sexual health peer educators only have access to. These students are required to have "office hours" which would be the ideal time to answer any questions that students have asked. It is believed that a text message intervention would be easily accessible to students and would eliminate the face to face interaction that some students may feel threatened by.

The literature indicates that technology is one of the main sources of communication for young adults of this generation. According to Malbon & Romo (2013), "the use of technologies and social media is widespread among adolescents and these tools have the potential for better healthcare delivery as well as improved health outcomes" (p.355). Currently, text messages have been used for results, partner notification services, health education messages, treatment reminders, and direct communication between patients and health providers (Malbon & Romo,

2013). Text messages that were used as a method to inform patients of their sexually transmitted infection were both diagnosed and treated sooner. It was also indicated that participants really enjoyed receiving information about sexual health through text messages (2013). This literature helps provides the necessary proof that a text message intervention would benefit the students of Western Michigan University.

Conclusion

All in all, there is definitely a need for education in any area where any sexually transmitted diseases are present. In Kalamazoo more specifically, there are two universities and a community college that contain a large portion of people living in Kalamazoo. Young adults 20-24 hold some of the highest rates for Kalamazoo County; therefore it is essential to target this age group initially.

Although the hypothesis of Kalamazoo County having a higher statistical rate of gonorrhea due to having a university in comparison to Jackson County was unable to be supported there are still several indications that further needs to be done. Gonorrhea in Kalamazoo County was ranked 9 in 2012 (MDCH, 2013). With Kalamazoo County being ranked in the top ten for gonorrhea, there is no doubt that steps need to be taken in order to find solutions to the problem.

Currently there is a cure for most gonorrhea infections. The research indicates that the future cannot promise that gonorrhea will always have treatment options. With gonorrhea being on critical observation for resistant strains, it is imperative to reduce infection rates entirely before all treatment options are eliminated and individuals have a lifelong diagnosis of gonorrhea.

Research should begin with surveying Western Michigan University students regarding sexual health promotion and sexual health education all together. It is indicated that students at four year institutions do not feel that adequate sexual health education is offered. Additionally, an evaluation method should be implemented to determine if the text message intervention and freshmen one-hour sexual health seminar at Western Michigan University was successful in reducing rates of gonorrhea in Kalamazoo County. The overall hope is that students at Western Michigan University become more educated in sexual health and this leads to a reduction in gonorrhea rates for Kalamazoo County.

Overall this thesis has shown that gonorrhea is a prevalent problem for college age students. Placing the focus on Kalamazoo County and Western Michigan University helps achieve the nationwide goal Health People 2020 have created regarding gonorrhea.

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