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The Effectiveness of a Pro-Abstinence Sex Education Curriculum in Singapore

Final Research Proposal

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Abstract

In this study, we investigate the impact of the pro-abstinence Sex Education curriculum on youths in Singapore, by examining if there is a relationship between pro-abstinence Sex Education and the rates of Sexually Transmitted diseases (STD)/Sexually Transmitted Infections (STI). As the rates of STD/STI transmission have been on the rise, it is crucial that the system be re-evaluated to include a curriculum that educates on protection and contraception. To study this relationship, we compiled secondary data over a course of 20 to 30 years from the Ministry of Health (MOH), as well as past studies of the impact of pro-abstinence Sex Education on youths aged between 16 to 25. Despite no research about the effectiveness of Singapore's sex education curriculum which was introduced in 2000, with multiple resources and research studies that were conducted in the United States, a comparison between the sex education curriculum in Singapore and reevaluated curriculums overseas can be made to draw a conclusion. Through regression analysis done on two different sets of data, we concluded that there was little to no difference in having a pro-abstinence Sex Education in decreasing the rate of both STI and STD.

Keywords: Pro-abstinence, Sex Education, STI/STD, Protections and Contraception

Introduction

The main objective of this research is to bring into light the disadvantages that result from a pro-abstinence sex education curriculum in Singapore. Based on a number of research and studies conducted in the past, we have identified a multitude of similarities that can be utilized and linked to our research. Having found that more often than not, youths have the tendency to act on their adolescent desires and that abstinence-based sex education has a detrimental effect on a youths psychological and physical well-being, averting a curriculum that includes the education of protection and contraception should be condemned.

Furthermore, observing how the rates of Sexually Transmitted Diseases (STD) and Sexually Transmitted Infections (STI) transmissions have never met an all-time low, the education of proper use of protection and contraceptives should with greater reason be taught during sex education in school.

Literature Review

A study conducted by Carr and Packham (2016) sought to determine whether states that adopted a pro-abstinence sex education curriculum experienced a change in STD rates, teenage pregnancy rates, and abortion rates relative to data extracted from states that do not impose a pro-abstinence sex education curriculum over a given time period. Although their findings pertaining to youth pregnancy and abortion rates were rather unsatisfactory, the results acquired from their studies relating to STD transmission rates were successful. Carr and Packham have found that students who have gone through an abstinence-based sex education curriculum rather than a comprehensive sex education curriculum are more susceptible to STDs due to the endorsement of abstinence in an abstinence-based sex education program. Carr and Packham also did a comparison of STD/STI transmission rates between states that conducted an abstinence-only sex education program with states that allowed for a comprehensive sex education program. For instance, Wisconsin, where the state stresses an abstinence-only sex education system was compared with California, where the state adopts a more comprehensive approach in sex education - where abstinence is encouraged, but the education on protection and contraception is included. Based on the Carr and Packham study, it was observed that states which stressed a pro-abstinence sex education curriculum generated results that were in support of Carr and Packham's supposition, where higher rates of STD/STI transmissions will be observed in states that stressed only on abstinence as compared to states that took on a comprehensive approach. Additionally,

schools that promote a pro-abstinence sex education curriculum often exclude information pertaining to contraception. This lack of contraception information amongst youths could potentially result in sexual habits that are of higher risks, which will in the fullness of time, result in higher rates of pregnancies and Sexually Transmitted Infection (STI) transmissions. With Singapore basing its entire sex education curriculum on the theme of “Abstinence: No Sex Before Marriage”, the information about protection and contraception is unfortunately excluded during education. Despite their enforcement of this curriculum, no obvious positive change has been observed. In fact, following their introduction of sex education in 2000, the rates of STD and STI Transmissions in Youths went on a rise (Cross Street Medical, n.d.). With results similar to those generated from the Carr and Packham study, an apparent explanation for the rise in STD transmissions in Youths can be attributed to the pro-abstinence sex education curriculum.

When an adolescent enters puberty, they reach sexual maturation. This would mean that abstinence until marriage is relatively unrealistic because of the extended gap between the beginning of puberty and marriage (Kendall, 2012). Singaporeans typically hit puberty between the ages of 8 and 15 years old, while the average age that Singaporeans marry is between 28-30. This would mean that the time of abstinence while in sexual maturation would last anytime between 15-20 years. In an age where sex before marriage has become the norm, intentionally preventing students of Singapore from the knowledge they deserve with regards to protection and contraception should not be permitted.

A study on sex education programs in the United States by Kohler et al. (2008) has also further shown that abstinence-only sex education programs had no significant impact in stopping or delaying the initiation of sexual activity or decreasing the risk for teen pregnancy and sexually transmitted diseases. In their study, they compared the sexual health risks of teenagers from the aged of 15 to 19 years (n=1719), who undergo comprehensive and

abstinence-only sex education to those who did not receive any form of sex education from the National Survey of Family Growth on teenagers who received formal sex education before their first sexual intercourse. The results are teenagers who have gone through comprehensive sex education programs have been substantially linked to a decreased risk of teenage pregnancy, whereas abstinence-only and no sex education programs have no significant impact on it. Furthermore, the possibility of vaginal intercourse was not diminished by abstinence-only sex education, while comprehensive sex education was slightly related to a lower risk of reporting vaginal intercourse (Kohler et al., 2008). Hence, this concludes that there was a lower risk of pregnancy for teenagers who received comprehensive sex education than those who went through abstinence-only or no sex education and comprehensive sex education has a greater impact on teenagers than abstinence-only sex education.

Research Question

Should sex education in Singapore be altered from promoting abstinence before marriage to protection against STDs or in general, how to protect yourself during sex?

The research question was generated following a discussion that entailed Singapore's teaching methods pertaining to Sex Education and its impact and effect on the cases of STDs. With Singapore's Sex Education framework heavily dependent on the teachings of abstinence while averting the inclusion of education about the use of protection and contraceptives, bringing to light the detrimental effects that result from a constrained and "old-school" teaching method is vital for an amendment of Singapore's Sex Education curriculum.

Theoretical Framework

There are several considerations that will correlate the effectiveness of abstinence-based sex education and the impact on youths' sexual health. The key independent variable will be the Sex Education System in Singapore which was introduced into the educational curriculum in 2000. According to Fonner et al. (2014), abstinence-only measures encourage delaying sex until marriage with little or no information on contraceptives or use of condoms, while comprehensive sexual education provides abstinence information as well as information on how to engage in safer sex to prevent pregnancies and sexually transmitted infections (STIs).

The dependent variable will be the Health Measures on Youths in Singapore. Several factors that are affected by the independent variable are the presence of STIs and STDs. An infection is usually the first step of a disease and it occurs when either bacteria or virus enters the body and starts multiplying. (Exposed, n.d.). When someone develops an STD from an STI, the effort to recover is enhanced, and the path to an absolute cure is difficult. Some examples of viral infections that are currently incurable are Hepatitis B, Herpes Simplex Virus (HSV), Human Immunodeficiency Virus (HIV), and Human Papillomavirus (HPV) (Snyder, 2018). These viruses may affect the STD rates as these numbers are not dependent on the education system in Singapore regarding sexual education. Mothers with STIs can pass their infection to the baby during pregnancy, delivery, or breastfeeding and this has no link to the sexual education system in Singapore. (DSC Clinic, n.d.).

The controlled variable will be the pricing and accessibility of contraceptives. In the USA, birth control pills, a form of contraceptive, are sold over the counter and they typically cost between \$0-\$50 without healthcare insurance. However, with most health insurance plans, birth control pills are completely free of charge. In the case of Singapore, birth control pills range from \$30-\$45 and are prohibited from being sold over the counter. Furthermore, in the US, condoms are priced less than a dollar for each piece, whereas the average price for a

single condom would cost approximately \$2.40. With prices that soar above a global norm, the accessibility and pricing of protection and contraceptives could potentially prevent the purchase of such necessities. This would mean that this higher pricing and inaccessibility could discourage an individual from opting out of contraceptives, thus contributing to the higher rates of STDs.

Research Methodologies

For a complete and concise analysis of the variables presented, the results of the survey conducted will be cross-referenced to the secondary data found from previous studies from local polytechnics and universities. Due to the nature of the topic being highly sensitive, anonymity will be highly respected in order to prevent youths from shying away from the survey. The survey will entail questions that require the youths to provide information with regards to the specific age where abstinence was no longer practiced. Having conducted a pre-survey, we discovered that the majority of our participants became sexually active between the ages of 15-21 with none of the participants being married. This meant that the results we received completely rendered the government's stance on "No Sex Until Marriage" with regards to the sex education curriculum ineffective.

Hypotheses

The null hypothesis (H_0) would be that the sex education curriculum in Singapore has no effect on STD transmission rates. The alternative hypothesis (H_1) is that the sex education curriculum in Singapore has an effect on STD transmission rates.

Study Design

With Singapore's Sex Education framework heavily dependent on the teachings of abstinence while averting the inclusion of education about the use of protection and contraceptives, a rise in STD transmission rates was observed in Singapore's annual HIV/AIDS statistics (Data.gov. 2019). This research will examine the teaching methods pertaining to Sex Education and its impact on the rates of STD transmission. The null hypothesis for this study is that the Sex Education curriculum in Singapore has no effect on STD transmission rates. Therefore, the alternative hypothesis is that the sex education curriculum in Singapore has an effect on STD transmission rates. We would be using secondary data to aid in our research paper.

Population and Sample

Based on a survey our team previously conducted, it was noted that the majority of participants started actively engaging in sexual activities before marriage, between the ages of 15 and 21. With data that demonstrated a pattern that showcased the predominant age where the general population becomes sexually active, the designated population for this study would be youths between the ages of 16 and 26, while the sample for this study would be students from local polytechnics and universities.

Variables and Measures

The key independent variable will be the Sex Education System in Singapore which was introduced into the educational curriculum in 2000 while the dependent variable will be the rate of STD transmissions on Youths in Singapore. Taking on either a pro-abstinence or comprehensive sex education curriculum will have a direct impact on the STD Transmission

rates. Where a higher rate of STD transmission is observed in a sample of youths that have undergone a pro-abstinence sex education curriculum, while a lower rate of STD transmission is observed in a sample of youths that underwent a comprehensive sex education program instead. Initially, the rates of pregnant teenagers and rates of abortion were considered to include as the dependent variable. However, research by Carr & Peckham showed no direct relationship between a pro-abstinence sex education curriculum and the rates of pregnant teenagers and rates of abortion, only a direct relationship between pro-abstinence sex education and rates of STD/STI Transmissions.

The controlled variable will be the pricing and accessibility of contraceptives. In Singapore, the price labels put on protection or contraceptives soar above a global norm. There is also the added difficulty of purchasing contraceptives such as birth control pills or Plan B since they are not sold over-the-counter (OTC). Furthermore, condoms are often shelved near the cashiering counters, which provides unnecessary embarrassment for buyers. With a multitude of complications, an individual could certainly be discouraged from purchasing protection or contraceptives to simply avoid the added hassle and higher prices, thus contributing to the higher rates of STD transmissions.

The variables will be measured as follows:

1. Independent Variable: Sex Education in Singapore Reference Carr and Packham study (2016)

The measurement for the key independent variable which is the Sex Education System in Singapore will be an allusion to the study conducted by Carr and Packham. Seeking to determine whether the rates of STD transmissions will be affected by the type of sex education curriculum a youth undergoes, Carr and Packham conducted a study that observed the rates of STD transmissions for every 1000 students in each state, comparing the

states that promoted pro-abstinence versus states that took on a comprehensive sex education curriculum. Emulating the results generated from the Carr and Packham study, binary variables will be utilized to distinguish the years into categories of before and after sex education was introduced in Singapore, with '0' denoting the years before sex education was introduced, and '1' denoting the years following the introduction of sex education.

2. Dependent Variable: Secondary Data

The dependent variable which is the Secondary Data will be measured by the amount of STD/STI transmissions among the youths in Singapore with data of yearly STD/STI cases from the Ministry of Health (MOH).

3. Controlled Variable: Secondary Data

The controlled variable will be measured by using secondary data. The prices of protection and contraceptives from various countries will be compared to those in Singapore. With data that highlights the higher prices of protection and contraceptives in Singapore as compared to other parts of the world, it is a factor that could potentially prevent or discourage one from making a purchase.

| Location | Price per condom (Local Currency) | Price (SGD) |
|---------------|--|-------------|
| Singapore | \$2-\$3 per condom (box of 12) | \$2-\$3 |
| United States | \$0-\$1 per condom (box of 12/planned parenthood) | \$0-\$1.33 |
| Australia | \$0-\$0.58 per condom (box of 12/family planning clinic) | \$0-\$0.60 |
| India | 18 rupees per condom (box of 10) | \$0.36 |
| Europe | £0-£0.38 per condom (box | \$0-\$0.71 |

| | | |
|--|------------------------------|--|
| | of 12/sexual health clinics) | |
|--|------------------------------|--|

Figure 1: Pricing of Condoms Around The World

Formula

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

Legend:

Y = Rate of HIV/AIDS, Rate of STI

B = Constant

ε = Error term from residuals

X1 = Measure of Pro-Abstinence Sex Education in Singapore

X2 = Price of Contraceptives

Data Collection Methods

With sexually transmitted diseases being one of this study's dependent variables, the research will primarily be divided into data sets that encompass Singapore's circumstances in pertinence to STD cases before and after the year 2000 (when the Ministry of Health [MOH] introduced its pro-abstinence sex education program). The first data set retrieved from MOH will be the number of HIV/AIDS cases between 1985 and 2014. This time-series data collected and compiled by MOH depicts the number of cases each year. The Descriptive statistics are as follows:

| <i>Number of cases</i> | |
|------------------------|-------------|
| Mean | 222.7333333 |
| Standard Error | 31.45903862 |
| Median | 216 |
| Standard Deviation | 172.3082509 |
| Range | 467 |
| Minimum | 2 |
| Maximum | 469 |
| Count | 30 |

Figure 2: Number of cases for HIV/AIDS from 1985 to 2014.

The second set retrieved from MOH's Communicable Diseases Surveillance webpage (2018) would be secondary data that illustrates the number of STD/STI transmissions (besides HIV/AIDS) within Singapore. This time-series data outlines the total number of STD/STI cases in Singapore between 1999 and 2018. The Descriptive statistics are as follows:

| <i>Total Sexually Transmitted infections</i> | |
|--|-------------|
| Mean | 9912.65 |
| Standard Error | 425.3625468 |
| Median | 10719.5 |
| Standard Deviation | 1902.279139 |
| Range | 6029 |
| Minimum | 6251 |
| Maximum | 12280 |
| Count | 20 |

Figure 3: Number of cases for Sexually Transmitted Diseases from 1999 to 2018.

Data Analysis Methods

Data Set 1 (HIV/AIDS)

Comparing the two gradients from the year 1985 to 1999, the slope is more gradual with an increment of 15 cases a year as compared to the data set from 2000 to 2014, which was after the pro-abstinence sex education curriculum in Singapore was implemented. The cases from 2000 to 2014 showed that there was an average of an additional 5 cases a year. This shows that although there wasn't much of a difference, the pro-abstinence sex education did not help in lowering the rates of these more common sexually transmitted diseases.

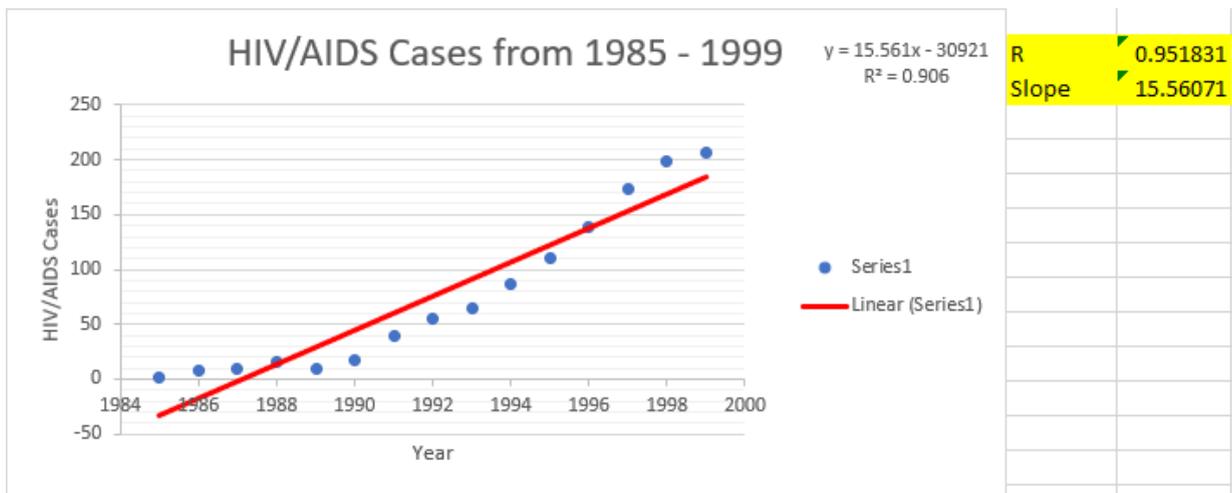


Figure 4: Linear regression for HIV/AIDS cases from 1985 to 1999.

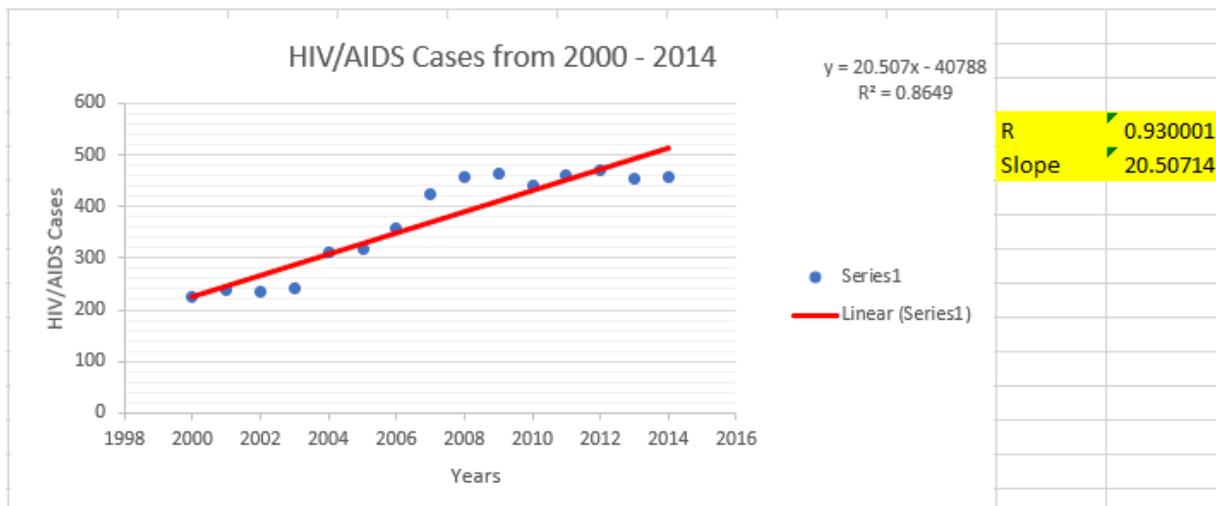


Figure 5: Linear regression for HIV cases from 2000 to 2014.

From the regression statistics, the number of AIDS/HIV cases is significant and its coefficient is 0.055 and hence every increment of year, it will increase by 0.05. The adjusted R square of 0.893 signifies that 89.3% of the observation could be explained by the estimated model as 89.3% of the data fall on the straight line.

| Regression Statistics | | | | | | | | |
|-----------------------|--------------|----------------|-------------|-------------|----------------|---------------|---------------|---------------|
| Multiple R | 0.9468246235 | | | | | | | |
| R Square | 0.8964768676 | | | | | | | |
| Adjusted R Square | 0.8932417698 | | | | | | | |
| Standard Error | 3.253745201 | | | | | | | |
| Observations | 34 | | | | | | | |
| ANOVA | | | | | | | | |
| | df | SS | MS | F | Significance F | | | |
| Regression | 1 | 2933.720549 | 2933.720549 | 277.1096576 | 0 | | | |
| Residual | 32 | 338.7794507 | 10.58685783 | | | | | |
| Total | 33 | 3272.5 | | | | | | |
| | Coefficients | Standard Error | t Stat | P-value | Lower 95% | Upper 95% | Lower 95% | Upper 95% |
| Intercept | 1988.189698 | 0.9750419548 | 2039.081178 | 2.12E-83 | 1986.203603 | 1990.175793 | 1986.203603 | 1990.175793 |
| number of HIV/AIDS | 0.0545569946 | 0.00327736346 | 16.64661099 | 2.56E-17 | 0.04788122384 | 0.06123276537 | 0.04788122384 | 0.06123276537 |

Figure 6: Regression Statistics of HIV Cases from 1985 to 2014.

Data Set 2 (Sexually Transmitted Infections)

Linear regression is used to analyze the sexually transmitted data set. This is because linear regression helps to predict the trend of the data and shows how much impact the dependent variable is causing. For this case, it can be seen that sexually transmitted infections have been on a constant rise since 1999, an estimated increment of 212 cases every year in which implies that abstinence-only sex education is not very effective in controlling the number of sexually transmitted infections.

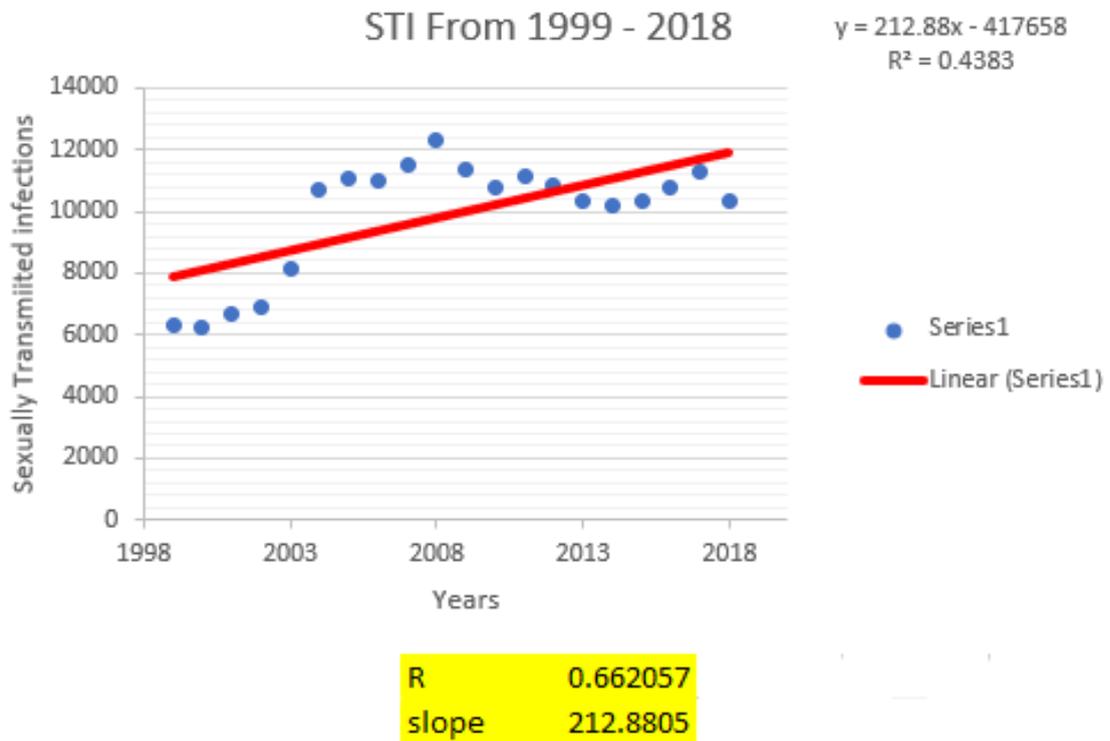


Figure 7: Linear regression for STI from 1999 to 2018.

From the regression statistics, the number of STI cases is significant and its coefficient is 0.002 and hence it is negligible.

| SUMMARY OUTPUT | | | | | | | | | |
|---------------------------------|---------------------|-------------------|---------------|----------------|---------------------|------------------|-------------------|-------------------|--|
| <i>Regression Statistics</i> | | | | | | | | | |
| Multiple R | 0.66205727 | | | | | | | | |
| R Square | 0.438319828 | | | | | | | | |
| Adjusted R Square | 0.407115374 | | | | | | | | |
| Standard Error | 4.55532237 | | | | | | | | |
| Observations | 20 | | | | | | | | |
| <i>ANOVA</i> | | | | | | | | | |
| | <i>df</i> | <i>SS</i> | <i>MS</i> | <i>F</i> | <i>gnificance F</i> | | | | |
| Regression | 1 | 291.4827 | 291.4827 | 14.04671 | 0.001473 | | | | |
| Residual | 18 | 373.5173 | 20.75096 | | | | | | |
| Total | 19 | 665 | | | | | | | |
| | <i>Coefficients</i> | <i>andard Err</i> | <i>t Stat</i> | <i>P-value</i> | <i>Lower 95%</i> | <i>Upper 95%</i> | <i>ower 95.0%</i> | <i>pper 95.0%</i> | |
| Intercept | 1988.089901 | 5.540195 | 358.8484 | 3.77E-36 | 1976.45 | 1999.729 | 1976.45 | 1999.729 | |
| Sexually Transmitted infections | 0.002058995 | 0.000549 | 3.747894 | 0.001473 | 0.000905 | 0.003213 | 0.000905 | 0.003213 | |

Figure 8: Regression Statistics of STI from 1999 to 2018.

Techniques used to analyze the data are very similar to a quasi-experimental study. However, due to the fact that quasi-experimental studies need a control and treatment group whereas our data only includes the before and after the pro-abstinence sex education curriculum. Our methods used are secondary data and regression analysis. Reasons our group decided to use these methods are because it contains the most accurate data coming from a government website. Therefore, due to the lack of a control group, we are unable to use a quasi-experimental study.

Conclusion

Having observed from multiple sources, data analysis, and the rising rates of STD/STI transmissions, it can be presumed that the pro-abstinence sex education curriculum adopted by Singapore is ineffective. With a goal to reduce the number of STD/STI cases in Singapore, the fundamental aim of this research would be to investigate and evaluate the effectiveness of the current sex education curriculum. Furthermore, with multiple studies in support of a comprehensive sex education curriculum rather than an abstinence-only program, the governing body in Singapore should consider a re-evaluation of the system to cater to the needs of youths in Singapore while increasing the effectiveness of sex education and reducing the rates of STD/STI transmissions, which have been on a persistent rise since 1999. Having various factors and results that are unequivocally against an abstinence-only program, our team hopes to overturn the current and ineffective curriculum to allow for a more comprehensive and educational approach.

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