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Relationship between STDs and hormonal contraception use among female adolescents

A Retrospective Chart Review

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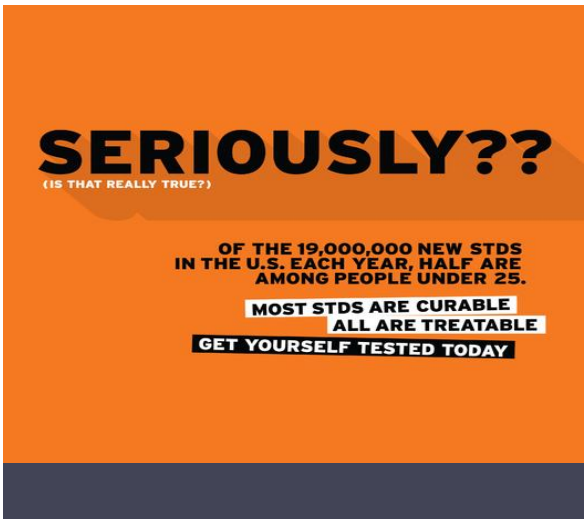
There are approximately 19 million new sexually transmitted infections (STIs) that occur every year in the United States and almost half of these are among young people aged 15 to 24 years. There are 34% of high school females who are sexually active in USA, and 30% who have used any form of hormonal contraception.[8]

The state of Illinois ranks third in number of overall cases of chlamydia and gonorrhea. For the past ten years, Peoria county has ranked in the top 5 counties in Illinois for the number of reported sexually transmitted diseases (STDs). The majority of cases among young persons aged 15-24 years.[1] While the number of reported cases for both chlamydia and gonorrhea in Peoria, have somewhat declined, their rates per 100,000 population are still almost 2-3 times higher than the State average.[7]

A clear understanding of the interaction between STDs and hormonal contraception is essential in providing services for family planning and management of STDs. This is especially important in an area where the rates of STDs are so high.



Chlamydia, Gonorrhea and Trichomoniasis are three commonly transmitted STDs.

Chlamydia is the most frequently reported bacterial sexually transmitted infection in the United States. An estimated 2.86 million infections occur annually.[11] A large number of cases are not reported because most people with chlamydia are asymptomatic and do not seek testing. Chlamydia prevalence among sexually-active young persons aged 14-24 years is nearly three times the prevalence among persons aged 25-39 years. It is estimated that 1 in 15 sexually active females aged 14-19 years has chlamydia.[11]

Chlamydia is caused by infection with *Chlamydia trachomatis*. It can cause cervicitis and lead to serious consequences including pelvic inflammatory disease (PID), tubal factor infertility, ectopic pregnancy, and chronic pelvic pain as well as Lymphogranuloma venereum (LGV), another type of STD caused by different serovars of this same bacterium.

Gonorrhea is another very common infectious disease. CDC estimates that, annually, 820,000 people in the United States get new gonorrheal infections, and less than half of these infections are detected and

reported to CDC. It is estimated that 570,000 of them were among young people 15-24 years of age.[11] Gonorrhea is caused by infection with the *Neisseria gonorrhoeae* bacterium. It can cause PID, infertility and increased risk of ectopic pregnancy due to fallopian tube damage. It can also lead to life threatening disseminated gonoccoccal infection characterized by tenosynovitis and/or dermatitis.

Trichomoniasis is caused by infection with protozoa Trichomonas vaginalis. In US estimated 3.7 million people have the infection but only 30% develop symptoms. Infection is more common in women than males.[11]

Previous studies have examined the impact of contraception use and STIs and have found associations.

In 2001, a Kenyan study showed that women of oral contraception (OCP) and Depot-medroxyprogesterone acetate (DMPA) were more likely to acquire chlamydia compared to those not on hormonal contraception. However, this same group was less likely to develop pelvic inflammatory disease (PID). They also found that women on DMPA were less likely to be diagnosed with trichomoniasis.[5]

Another study from South Africa, in 2009 showed that women on DMPA were less likely to be diagnosed with trichomoniasis or PID, and had an increased risk of gonorrhea and chlamydia. [3]

University of North Carolina, 2009 found no association between OCPs and DMPA use and *T. vaginalis* infection.[4]

FHI, Baltimore, 2004 study found that women using DMPA had approximately 3½ times the risk of developing a chlamydia or gonorrhea infection than did women who were not using a hormonal contraceptive.[10]

The purpose of this study is to examine the relationship between STDs and hormonal contraception use among female adolescents.

Methods

This was a retrospective chart review of Family Medicine Residency Clinic (FMC) outpatient records from July 2011 to June 2013. The study was carried out with the approval of the institution institutional review board. Data was collected from electronic medical records using a business objects report run on our EMR database.

Inclusion criteria included females aged 11-21 who had been tested positive for gonorrhea, chlamydia and/or trichomoniasis at FMC. Exclusion criteria included males of any age, females younger than 11 years or older than 21 years of age. Negative STD result, positive test result at any outside facility, including other affiliated MMG locations (such as ER, hospital, prompt care).

Search criteria included date of birth, presence of one or more of the following STDs: gonorrhea, chlamydia, trichomoniasis, hormonal contraception use and type of contraception – IUD, OCPs, implant, transdermal, DMPA,and/or vaginal ring.

Results

During our study period of July 2011 to June 2013, a total of 1055 females between the ages of 11 and 21 years visited the Family Medical Center. 102 of these females had gonorrhea, chlamydia, trichomoniasis, or more than one of these infections. 54 of these females were on a form of hormonal contraception at the time of their positive results.

10% of adolescents were found to have an STD (gonorrhea, chlamydia, trichomoniasis, multiple) and 5% were on contraception when they had this infection.

Out of our total sample size positive for STD the breakdown was as follows: Chlamydia-56%, Gonorrhea-13%, Trichomoniasis - 11%, Multiple STDs- 20% (refer to Graph 1).

Looking at the age distribution of all subjects with STD majority of patients (53%) were between the ages of 18-21. The youngest patient was 13 years old and no subjects were between the ages of 11-12 (refer to graph 3).

In patients using contraception the most common method of hormonal contraception was oral contraceptive pills which was 65% followed by implant (17%), Transdermal (7%), IUD (7%), DMPA (4%), and Vaginal ring (2%). (Refer to graph 4)

When looking at each STD individually and determining use of contraception, a greater number of females were on contraception when tested positive for gonorrhea and chlamydia. However, more females were not using contraception when found to have trichomoniasis (refer to graph 5).

Discussion

The most common STD among our study population was chlamydia at 56%. When assessing those on contraception, chlamydia was also the most common infection at 59%. The most common contraception used by ou study group was OCPs at 63% followed by implant at 17%.

Overall, there were more patients on contraception at time of positive STD results 53% while 47% were not on any hormonal contraception (Graph 2). However, we were unable to determine if there is a direct relationship between contraception use and STD as our results were not statistically significant due to the low power of our study.

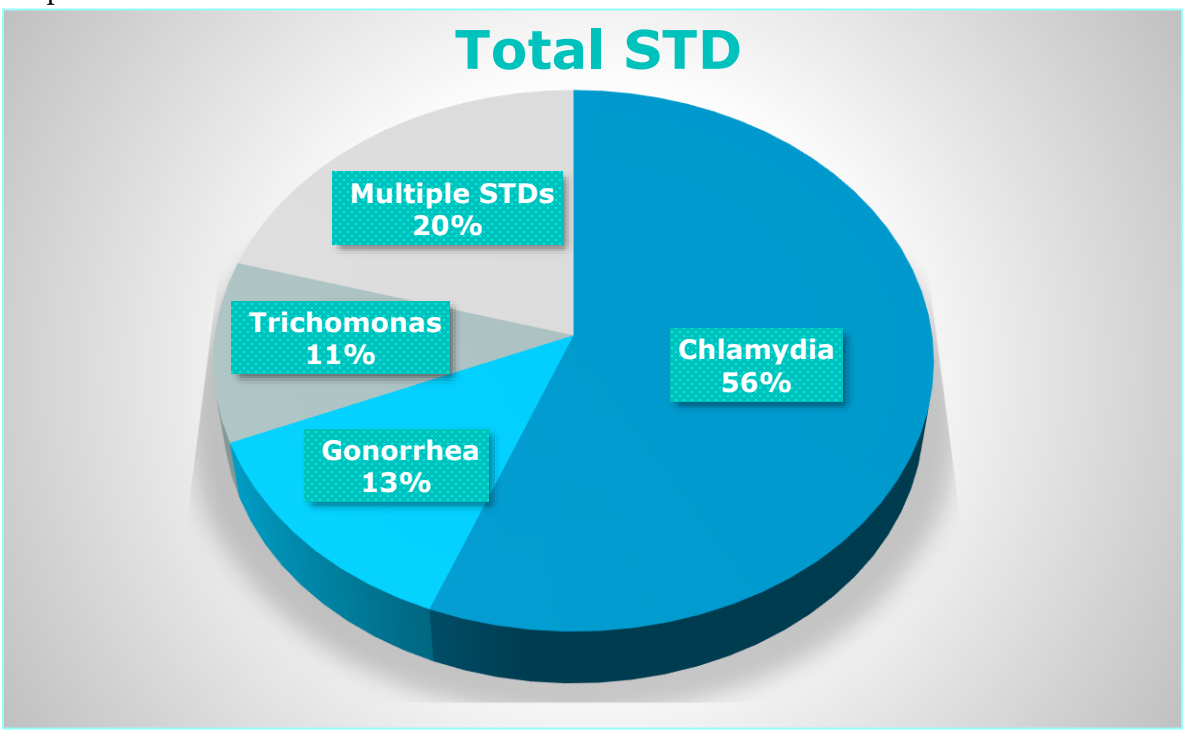
Reasons for a possible relationship between higher contraception use among those with an STD could be that these females have a false sense of security and may engage in high risk sexual behaviors because 1) they believe they are protected from pregnancy but do not think of risk of STDS. 2) Inadequate sex and health education and not realizing that hormonal contraceptives do not protect against STDs. 3) Is there an increased susceptibility to acquiring an STD while being on contraception? Previous research has shown that cervical ectopy may increase acquisition of STDs. Cervical ectopy occurs when the columnar epithelium found in the endocervical canal extends out onto the ectocervix. This is common among OCP and DMPA users.

There were many limitations to our study. We only looked at females between the ages of 11-21 years, however given that the high risk groups are 15-24 we should have increased our age to 24. We also only included subjects who had STD testing done at the Family Medical Center. If we had included the ED, hospital, and other MMG locations including urgent care our sample population size would have increased. Many of our patients go to the ER with complaints of discharge or wanting STD testing done before coming to the FMC. We also did not include STD recurrence, many of our subjects had multiple reinfections with the same STI during our study time frame. Our sample size was also quite small. We

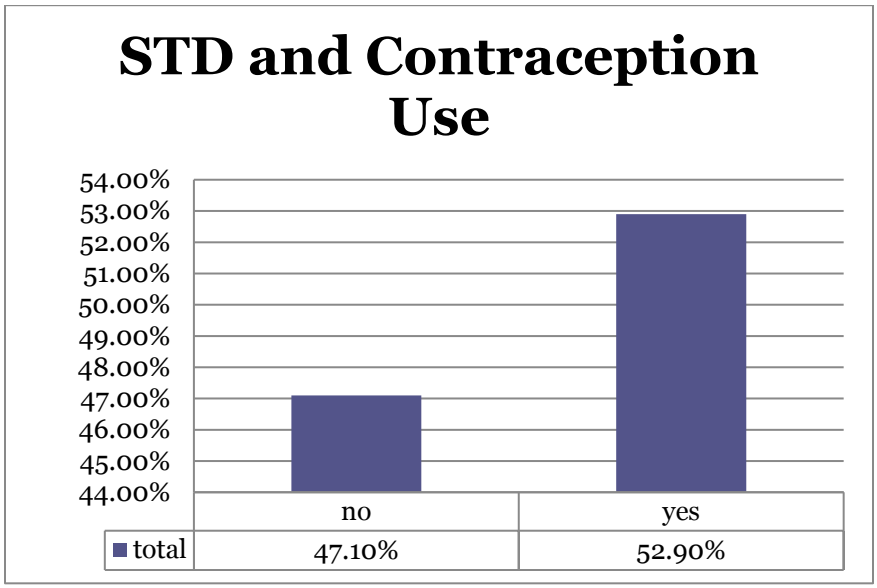
included adolescent females who tested positive for STD between the years 2011 to 2013 but if we had increased this time frame we would have larger sample size. There were also many confounding variables that we did not evaluate such as number of sexual partners, previous history of STDs, health data or even when they were initially infected. We did not look at all STDs such as HIV, HSV, HPV, syphilis. We also were unable to determine if subjects had received hormonal contraception elsewhere such as the public health department, Planned Parenthood or school clinics. We also cannot account for STI testing and treatment outside of MMG. When looking at performing further studies in the future it would be beneficial targeting these limitations and therefore increasing our sample size, thereby, increasing our study power and potentially finding statistically significant results.

Graphs

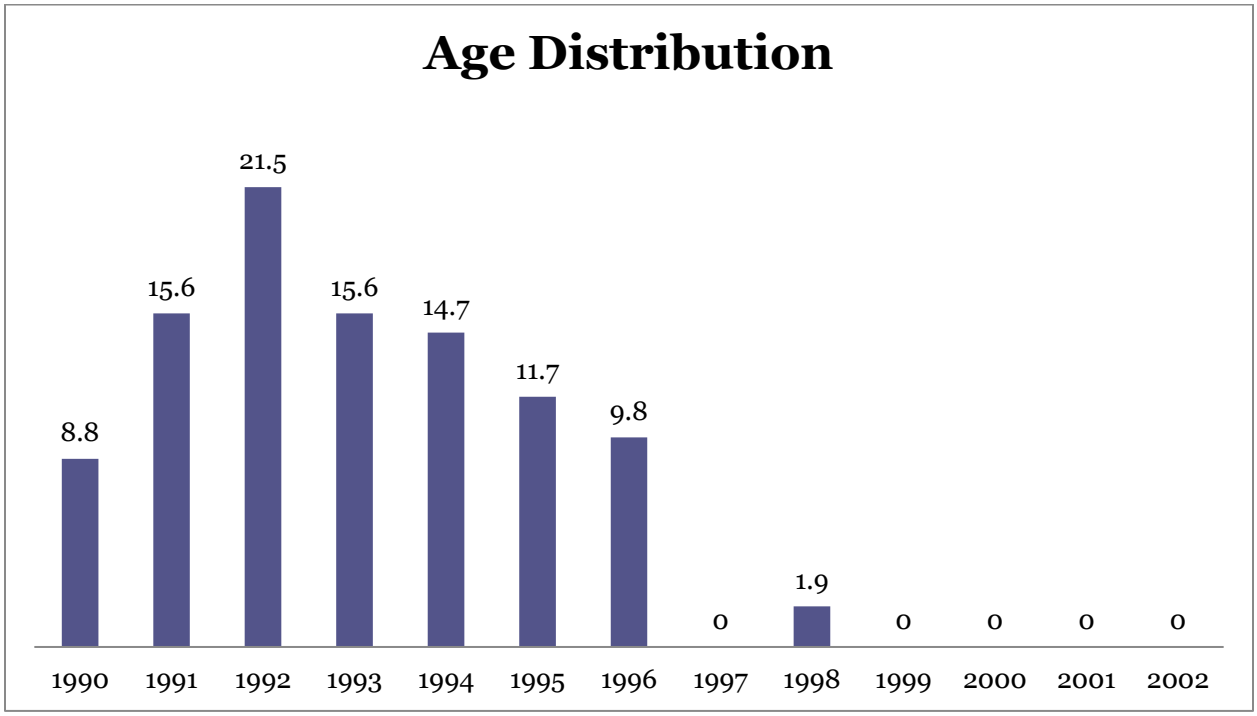
Graph 1



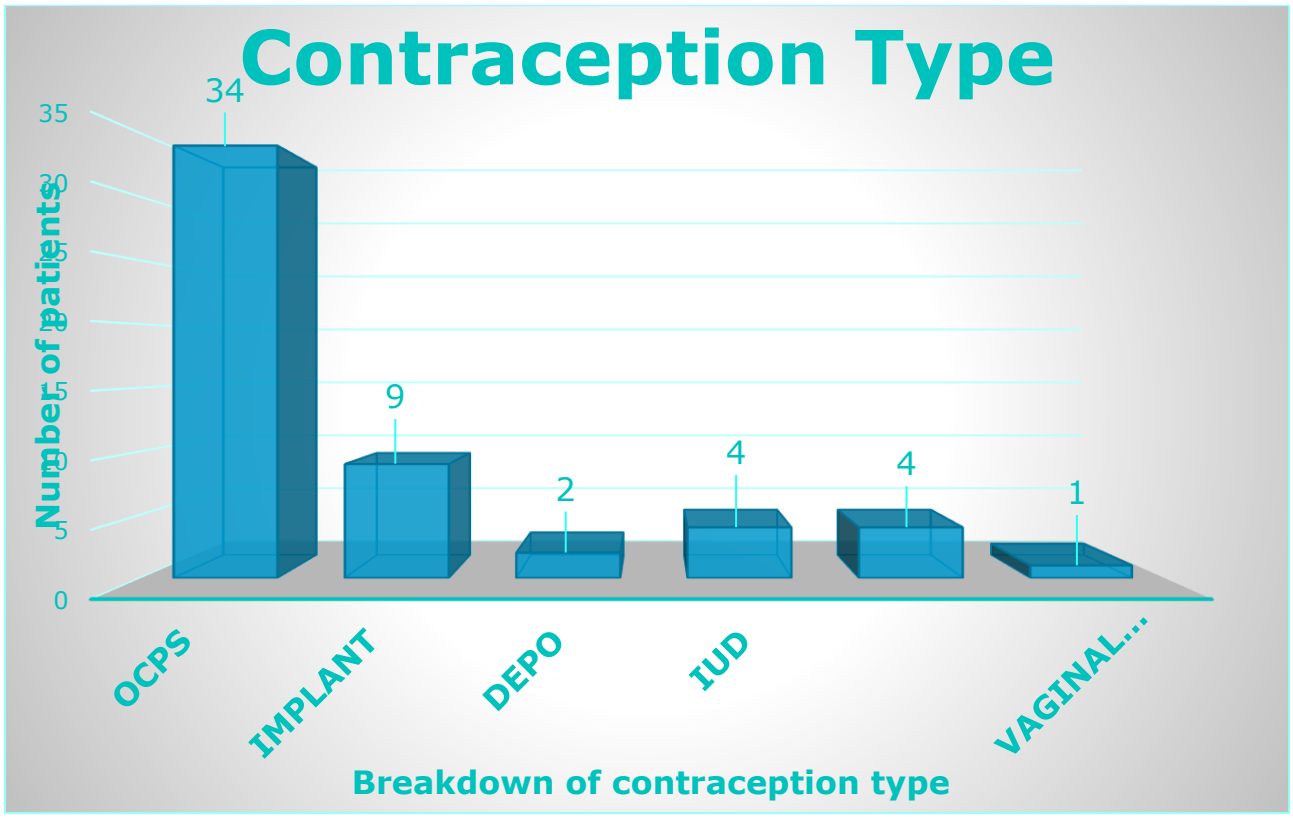
Graph 2



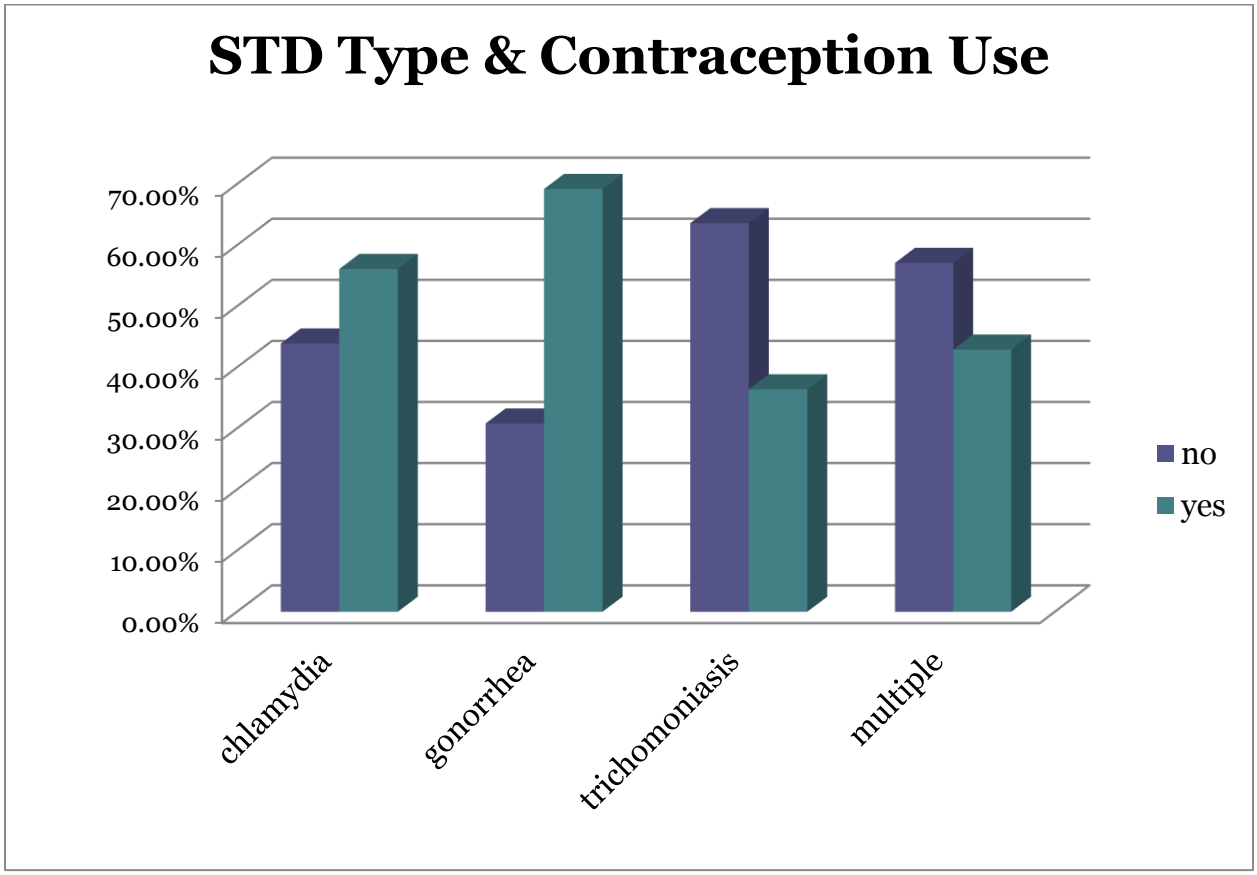
Graph 3



Graph 4



Graph 5


STD Type & Contraception Use
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
chlamydia
gonorrhea
trichomoniasis
multiple
no
yes

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