STDs in Female Undergraduate Students

Proposal Title:	The Prevalence of Sexually Transmitted Diseases (STDs) among Sexually Active Female Undergraduate Students: A Cross-sectional Quantitative Study
Group Members: Group 21	[redacted]
Class/Section:	HSC 4730-0004
Class Semester (Year):	Spring 2020
Data Collection:	Primary

Abstract

Introduction: Sexually transmitted diseases (STDs) are infections that are transmitted through sexual relations from person to person contact. Non-barrier hormonal contraceptives such as oral contraceptives and intrauterine devices are methods of contraception that do not physically prevent contact.

Purpose Statement: To evaluate the relationship between the use of non-barrier hormonal contraceptives and the prevalence of STDs in sexually active undergraduate female students.

Methods: A 12-item sexual behavior questionnaire will be used to conduct a cross-sectional quantitative study for 30 days. The UCF Health Center will send out a mass email through a student directory containing the link to the online questionnaire and students who choose to participate will be assessed based on the inclusion criteria. The sample population will consist of approximately 500 sexually active female undergraduate students aged between 18-25 years. After data collection, the prevalence of STDs among the specific non-barrier hormonal contraceptives that used condoms and those that did not use condoms will be measured and compared.

Hypothesis: We hypothesize that there is a direct positive correlation between the use of non-barrier hormonal contraceptives and an increased rate of STDs in female undergraduate populations.

Future Implications: This study can reinforce what university healthcare programs should address. There is often an emphasis on contraception primarily as a measure against pregnancy, but this study will promote using both barrier and non-barrier methods of contraception to prevent unwanted pregnancy and STDs.

Keywords: sexually transmitted disease; infection; hormonal contraceptives; condoms; undergraduate; female

STDs in Female Undergraduate Students

Introduction:

Sexually transmitted diseases (STDs) and sexually transmitted infections (STIs) are acquired from person to person through sexual intercourse. STDs can be prevented through barrier contraceptives, abstinence, and sex education. Public health efforts that focus on utilizing barrier contraceptives (condoms, sponges, cervical cap, and diaphragms) that prevent the spread of STDs and STIs have been promoted nationwide to reduce the rate of transmission for these diseases.[1] The male condom is the most widely used form of contraception as they prevent both STDs and unplanned pregnancy; however, there has been an increase in the use of non-barrier forms of contraception, such as oral contraceptives (also known as the "pill") and intrauterine devices, as they are more effective at preventing unplanned pregnancies. The use of non-barrier contraceptive methods instead of the male condom poses a threat to the sexual health of women.

Background:

According to the World Health Organization (WHO), more than 1 million STIs are acquired each day.[2] Young adults aged 15-24 consist of approximately half of all newly acquired STDs, as seen in Figure 2.[3] When regarding the sexual and reproductive health for young women in the United States, STDs and STIs are of prominent concerns since 1 in 4 sexually active young females have an STD.[4] Sexually transmitted diseases are bacterial or viral in origin. The most common bacterial STDs are chlamydia, gonorrhea, syphilis, and trichomoniasis. The most common viral STDs include human papillomavirus (HPV), herpes simplex virus (HSV), human immunodeficiency virus (HIV), and hepatitis B. Females with STDs can either be asymptomatic or experience symptoms such as vaginal discharge, vaginal blisters, burning with urination, and pelvic pain. Women that have acquired gonorrhea or chlamydia have an increased risk of developing the pelvic inflammatory disorder (PID) or infertility if left untreated, making prevention and treatment of STDs pivotal for the advancement of women's health.[5]

There are a variety of contraceptive methods available that allow individuals to prevent unplanned pregnancies. Different contraceptive methods that are offered are the pill, intrauterine device, male and female condoms, sterilization, and fertility awareness.

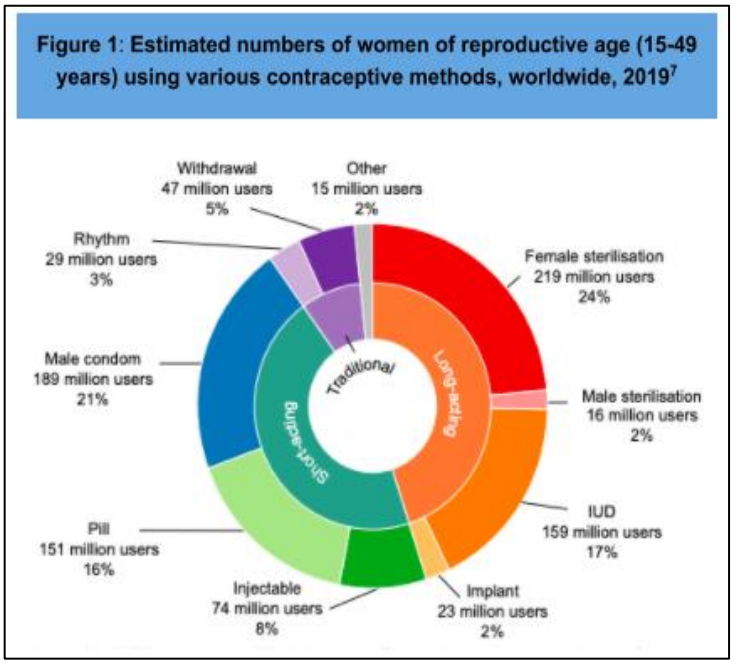


Figure 1: **Estimated numbers of women of reproductive age (15-49 years) using various contraceptive methods, worldwide, 2019** represents the distribution of the different forms of contraception used among women worldwide. The most widely used method is female sterilization, preferred by 24% of the women that utilize contraception. Male condoms are the second most widely used at 21%, and intrauterine devices and "the pill", a form of oral contraception, are the third and fourth most widely used forms of contraception, respectively.[6]

The only form of contraception that prevents STDs and STIs are male and female condoms. In 2019, male condoms were the second most utilized forms of birth control worldwide, with female sterilization being the most commonly used method, as depicted in Figure 1.[6] However, male condoms are only about 85% effective and are not the most convenient form of birth control.[3] Many women have begun to utilize hormonal contraceptives such as the pill or an intrauterine device (IUD). These two forms of birth control

provide continuous protection from unplanned pregnancy and are about 95% effective. The pill and IUD are gaining popularity due to their effectiveness at preventing unplanned pregnancies, but these contraceptives do no prevent STDs and STIs. The literature shows that women who utilize long-acting reversible contraception (LARC) tend to be more sexually active with a greater number of sex partners, making them more susceptible to STDs and STIs.[7] Most of the literature emphasizes that young adults, between the ages 18-24, are the population most at risk for STDs as seen in Figure 2.[3]

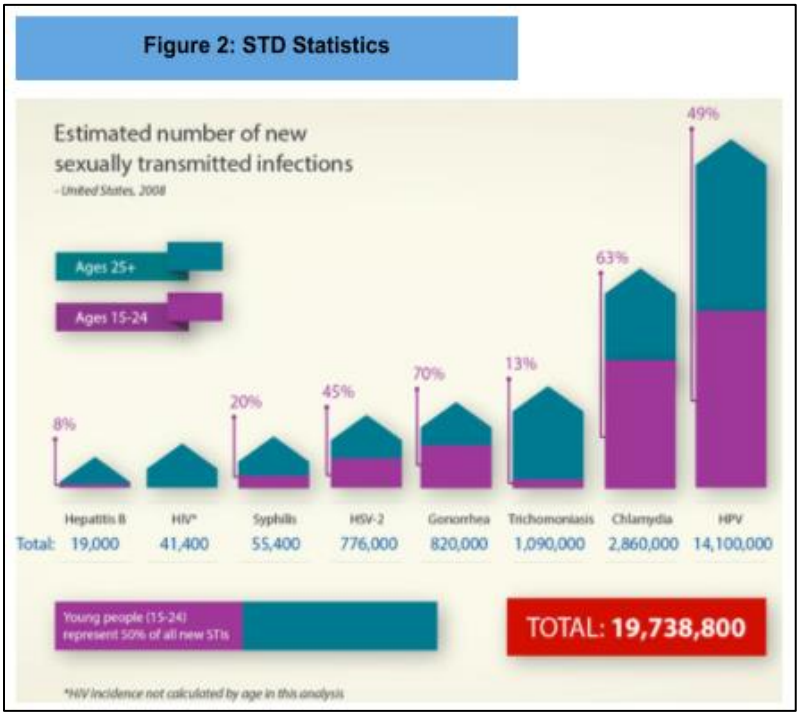
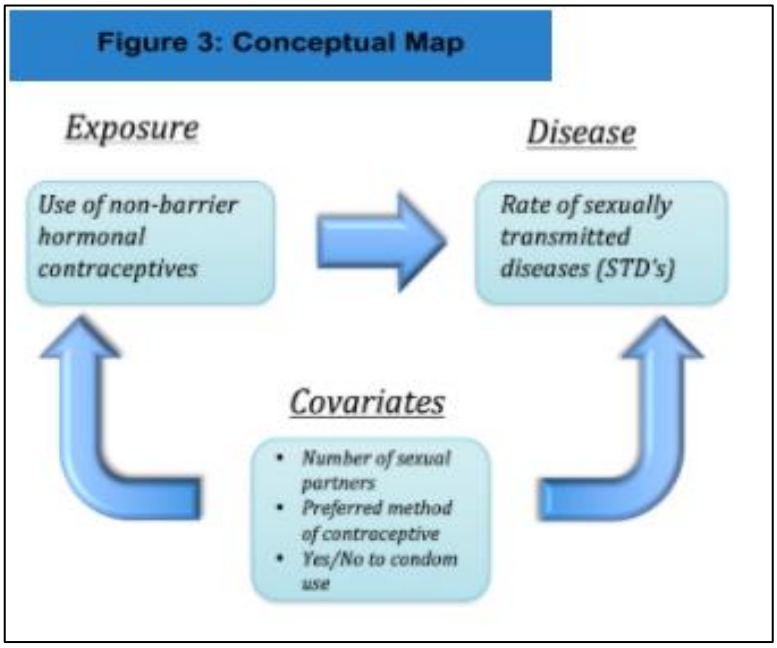


Figure 2: STD Statistics represents the estimated number of various newly acquired STDs among those aged 15-24 and those aged 25 and older in the United States in 2008. It shows young people aged 15-24 represent half of all new STIs with this population having 63% of chlamydia cases and 70% of gonorrhea cases. The diseases depicted in this figure are hepatitis B, HIV, syphilis, HSV-2, gonorrhea, trichomoniasis, chlamydia, and HPV. Chlamydia and HPV represent the most commonly diagnosed sexually transmitted infections.[3]

The population that we believe has the highest risk of contracting STDs and STIs, due to age and environmental exposure, are women in college that use non-barrier hormonal forms of contraception. Therefore**, the primary aim of this study** is to ascertain the relationship of the use of non-barrier hormonal forms of contraception on the STD/STI rates among sexually active female students, between the ages of 18-25, at the University of Central Florida.

Study Design: We plan to conduct a cross-sectional quantitative study that will employ a 12-item sexual behavior questionnaire to students at the University of Central Florida(UCF) in partnership with the UCF Health Center(See appendix). This questionnaire will allow us to distinguish between the individuals that use non-barrier forms of contraception versus the individuals that primarily use male or female condoms. The desired study design is a cross-sectional quantitative study because within a short period we will be able to measure the prevalence of a particular exposure or disease in a proportion of a population. In this study, we will be obtaining the prevalence of sexually transmitted diseases (STDs) among sexually active female undergraduate students that use non-barrier hormonal contraceptives. Our cross-sectional quantitative study design is consistent with other peer-reviewed studies.[8-10]



Setting:

This study will be implemented at the University of Central Florida (UCF). The cross-sectional quantitative study, 12-item sexual behavior questionnaire will be conducted online via the Qualtrics Survey Software with the collaboration, assistance, and approval of the UCF Health Center. UCF is one of the largest universities in the United States by enrollment, which will allow us to obtain an adequate sample size that will be representative of female college students in the United States.[11]

Sample:

Our target population is sexually active female undergraduate students aged between 18 and 25 who use a non-barrier hormonal contraceptive. We are focused on this population because most of the literature emphasizes that young adults, between the ages of 18-24, are the population most at risk for STDs and we expanded on that fact by centering the study in a university.[3] Our source population will be all-female undergraduate students that attend UCF. Our estimated sample population will consist of a minimum of 500 participants(survey takers) who meet the inclusion criteria. Based on research from prior cross-sectional studies focused on STDs in college students, our estimated sample population will be the largest[8-10]. Our sample population is large to minimize limitations associated with small sample sizes.

Inclusion Criteria:

For our inclusion criteria, we will use females who are undergraduate students (regardless of major), aged between 18 and 25. These female undergraduate students must have been sexually active within the last year from the date that the 12-item questionnaire was taken. Also, to be included within the sample population, the participants must have used a non-barrier hormonal contraceptive within the last year.

Exclusion Criteria:

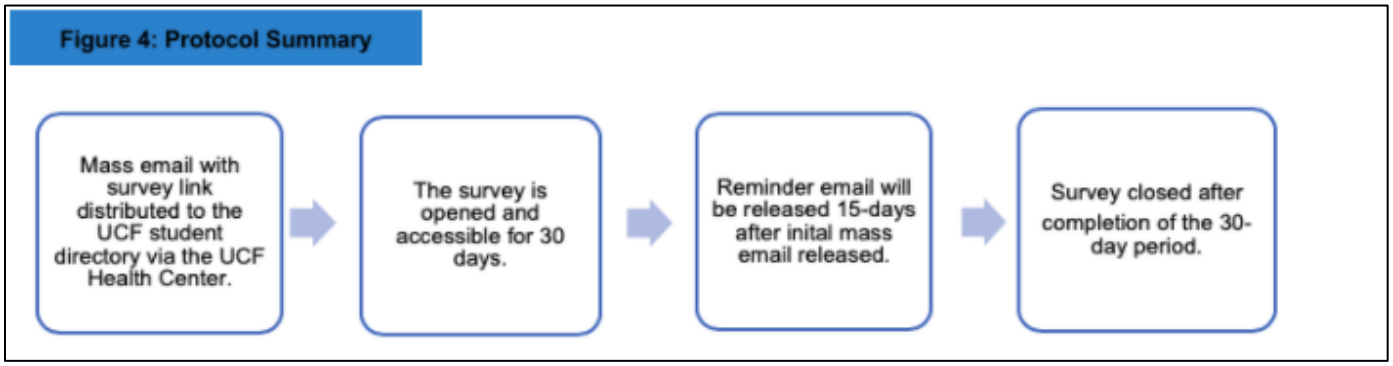
For our exclusion criteria, male survey takers' questionnaires will be discarded. The same action will occur for female survey takers who are not undergraduate students and have not been sexually active within the last year. If a female survey taker does not meet the age range and does not use a non-barrier hormonal contraceptive that participant will also be excluded from the sample population.

Protocol:

A cross-sectional quantitative study consisting of a 12-item sexual behavior questionnaire will be conducted for 30 days (approximately one-month) at UCF. The 12-item questionnaire will be structured in a way that if the student does not reach the inclusion criteria they will be exited out of the survey. Also, the participant will only be able to select one option per question and they will not be able to revisit a past question once the next button is clicked.

With the collaboration and approval from the UCF Health Center, the 12-item sexual behavior questionnaire will be sent in a mass email to the entire UCF student directory (source population). The subject line will read "UCF Health Undergraduate Research Survey". The message will briefly discuss how the student responses will be helpful and state the incentive of the possible chance to win a $50 gift card upon completion of the questionnaire. Also, the email will emphasize the importance of confidentiality, stating that the student responses are anonymous and will not be disclosed. Beneath the message, the Qualtrics Survey Software link will be located. The Qualtrics Survey Software link, once activated, will direct students to the 12-item sexual behavior questionnaire. Before entering the questionnaire, students will need to enter their student NID. At UCF, a student's NID is their sign-on identification. By requiring the survey takers to enter their NID, this will ensure that we do not receive multiple questionnaires filled out by the same student.

Once the email has been distributed, the link will remain open for 30 days (approximately one month); Then, 15 days into the 30-day limit another email will be sent out as a reminder for students to complete the questionnaire if they have not done so already. The reminder email will contain the Qualtrics Survey Software link as well if the first email was discarded or misplaced. When the 30-day time constraint has passed, the Qualtrics Survey Software link will be locked. From there the data from the 12-item sexual behavior questionnaire will be collected, measured, and conclusions will be formed based on the results.



Conditions or Groups:

The cross-sectional study will only include data gathered from the University of Central Florida undergraduate female students between the ages of 18-25. To be considered a valid candidate for the study, the person must also be sexually active from at least the past 12 months. Each of the 500 women will complete a 12-item questionnaire that will be submitted anonymously online via the Qualtrics Survey Software with the collaboration, assistance, and approval of the UCF Health Center within 30 days. There will be no gathered data from any male attending the university.

Measures:

The measures will be conducted after the completion of the 30 days. We will calculate the prevalence of STDs among the specific non-barrier hormonal contraceptives that used condoms and those that did not use condoms. Prevalence is the number of people in the sample with the characteristic of interest, divided by the total number of people in the sample. Each form of non-barrier hormonal contraceptive will behave as its group as displayed in question 10 of the questionnaire (See appendix). Each group will be divided into two categories those that used condoms and those that did not. Then within each group for each of the two categories, we will take the total number of those that selected “yes” to being diagnosed with an STD within the last year and divide it by the total number of participants that fall within the category of interest. The same calculation will be followed, for those participants that marked “no " to being diagnosed with an STD within the last year. Moreover, with all the data collected, we will measure the total prevalence of STDs among all non-barrier hormonal contraceptives regardless of condom usage.

Since prevalence is a descriptive statistic, we cannot generate a p-value by calculating the prevalence of one category alone. However, one can compare the prevalence of two or more groups and that will yield a p-value as seen in previous studies.[12] For our study, the p-value of interest will be measured by comparing the prevalence of the STD total of the two categories of those that use condoms compared to those that did not use condoms within each non-barrier hormonal contraceptive group. Our test hypothesis will be tested true if the p-value is statistically non-significant with the p-value greater than or equal to 0.05. Likewise, if the p-value is less than 0.5 then this means the results are statistically significant and our test hypothesizes should be rejected.[13]

Data Handling Procedures:

The participants will be informed that the survey is anonymous and that their identity will not be revealed, they will be identified as their NID number. The NID is to ensure that there is no repeating data and that each individual only takes the survey once. The participants will have only one month to complete the survey from its initial

Figure 5: 6x6 Data Table Example

Method of Hormonal Contraceptive	Number of participants using this method of contraception	Number of participants who have also used condoms in the last year	Number of participants who do not use condoms and have been diagnosed with an STD in the last year	Number of participants who do not use condoms and have not been diagnosed with an STD	Number of participants who use condoms and have not been diagnosed with an STD	Number of participants who use condoms and have been diagnosed with an STD
Oral contraceptive (Birth control pill)	250	70 180 did not	120	60	50	20
Contraceptive implants (upper-arm implant)	80	20 60 did not	50	10	15	5
Hormonal skin patch	9	8 1 did not	1	0	8	0
Intrauterine device (IUD)	100	30 70 did not	60	10	20	10
Vaginal ring	15	10 5 did not	5	0	10	0
Depo-Provera injection	46	15 31 did not	26	5	15	0

release date. Throughout the survey, participants will only be allowed to answer one question at a time without being able to go back to change their answers. This survey style was implemented to reduce the chances of any response bias. Once the research team gathers the data, it will be condensed and input into a 6x6 table to compare and contrast the outcomes of each preferred method of hormonal contraceptive in conjunction with condom use to determine their effect on the rate of STDs in the participants. We will need to calculate the row percentage and calculate the prevalence rate among those that have been diagnosed with an STD, those that don't have an STD, and those that do and do not use a contraceptive barrier. In this scenario, we can use the Chi-square test (or Fisher's exact test) to calculate the p-value.

Analytic Plan:

The independent variable of this study is the female undergraduate student form of non-barrier hormonal contraceptive whether with condoms or without. The dependent variable is the prevalence of STDs within each method of non-barrier hormonal contraceptive use addressed in the questionnaire(See appendix). With this independent and dependent variable, we can evaluate if there is a possible correlation between a sexually active female undergraduate student's preferred form of non-barrier hormonal contraceptive use with or without condoms and the prevalence of STDs. The association between the factors and prevalence can be made by creating a table like the one shown in the data handling procedures. We can apply the Clopper-Person method to calculate the 95% confidence interval for the prevalence however, we can still use the Chi-square sheet to calculate the p-value.[13]

Limitations:

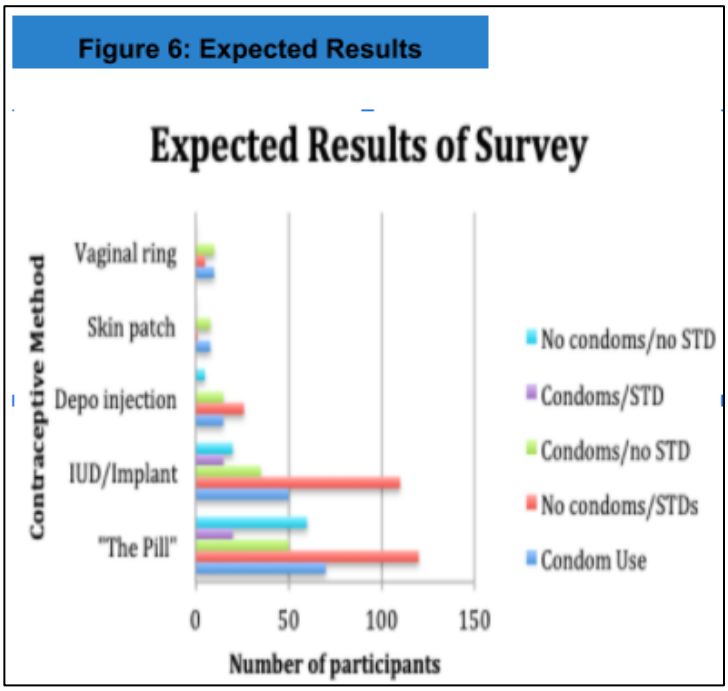
Performing a sexual behavioral questionnaire gives this study many limitations due to the heavy reliance on feedback from its participants. When receiving information from UCF undergraduates this survey being conducted asks some very uncomfortable questions for some students to give honest answers due to the personal questions being asked in the questionnaire. Some may feel too embarrassed to admit to having many sexual partners or even in denial. Another limitation in the study is response bias for there is a risk of students being surveyed may withhold information and not answer the questions truthfully potentially invalidating the information displayed in the results. Another limitation is many students attending Universities have limited income and cannot afford health insurance to get tested regularly. Students who aren't being tested for sexually transmitted diseases and/or sexually transmitted infections aren't aware that they can test positive for the sexually transmitted diseases and/or sexually transmitted infections. A big issue as well as asking someone to recall information from the past provides bias of obtaining self-reported data due to the study requiring students to recall information from the past as far as 365 days. The sample population is another key limitation as it is

necessary to continue the study to have high participation of a minimum of 500 sexually active undergraduate students to take part in this sexual behavioral questionnaire in a constricted period of 30 days. Failure to receive 500 eligible undergraduate student participants completing the questionnaire this study wouldn't be possible and no information could be taken from it.

Expected Results:

When evaluating the relationship between the use of non-barrier hormonal contraceptives like oral contraceptives, IUD implant, and many others without condom usage can increase STD rates in female students at UCF. When looking at the results, we anticipate that the results will effectively support the proposed hypothesis of a direct positive correlation between the use of non-barrier hormonal contraceptives and an increased rate of STDs in female college populations. After surveying students, we expect those who used a non-barrier hormonal contraceptive without condom usage will contain the largest proportion of students who tested positive for an STD within the last year. In contrast, we anticipate a lower proportion of students who have used a condom to have tested positive for an STD. Due to the popularity of oral contraceptives ("The Pill") and IUD, we expect these to be the most preferred non-barrier hormonal contraceptive among the female undergraduate population. Therefore, these results combined with other studies make it clear just how important condoms are in STD prevention and safer sex.

Figure 6: Expected Results



Ethical Considerations:

The research will be conducted through a survey distributed to each of the participants. To guarantee that the study adheres to the principles of ethics, all members of the research team will be required to complete and obtain a CITI training certificate in ethical research. Additionally, the UCF institutional review board (IRB) will approve all plans and procedures of the project. Informed consent will be obtained from each student who participates in the study. They will be informed that their participation is voluntary, and all information collected from the survey will be used in a research study but will remain anonymous and only identified by their NID. This ensures privacy, HIPAA compliance, and transparency for each student part taking in the study. To promote participation for data collection, each student that meets the inclusion criteria and completes the questionnaire will automatically be entered in a drawing for a chance to win 1 of 5 available $50 gift cards. This proof of completion will simply state that the individual had submitted a survey and will not reveal any information regarding their responses to maintain anonymity in the data results.

Future Implications:

Following the completion of the study, if the findings confirm our hypothesis that hormonal contraceptive use increases the likelihood of STDs in women between the ages of 18-25, then it will be clear as to what the health programs at universities across the country should be addressing when it comes to STD prevention and safer sex. There needs to be an emphasis on how precautions need to be taken for both pregnancy and STD protection. Additional studies would benefit from a change of scenery, specifically another college campus other than UCF or with a focus on a separate age group to ensure generalizability and reproducibility of the study. Future studies could also be formatted to include male survey responses and how hormonal contraceptives alter their view on condom/barrier contraceptive use. In addition to other cross-sectional studies, interventional studies could also be conducted using variables and control groups.

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Appendix

UCF Undergraduate Research Study

All questions contained in this questionnaire our confidential and anonymous.

1. **Biological Sex**
   - Male
   - Female

2. **What is your current student status at UCF?**
   - Undergraduate
   - Graduate
   - Other

3. **Ethnicity**
   - White or Caucasian
   - Black or African American
   - Hispanic or Latino
   - Asian or Asian American
   - American Indian or Alaska Native
   - Native Hawaiian or other Pacific Islander
   - Another race

4. **Age**
   - Under 18
   - 18 – 21
   - 21 – 25
   - Over 25

5. **Which of the following best describes your current relationship status?**
   - Married
   - In a relationship
   - Single
   - Other

6. **Have you been sexually active in the last year?** ("Last year" refers to 365 days prior to the completion of this survey)
   - Yes
   - No

If you are a male, graduate and other, under 18 or over 25, and those that mark not being sexually active in the last year the survey taker will be automatically exited out of the survey and the screen will state "Thank you for your response!"

7. **How many sexual partners have you had in the last year?**
   - 1
   - 2 – 4
   - 5 or more

8. **Have you ever been diagnosed with a sexually transmitted disease within the last year?**
   - Yes
   - No

9. **Do you use contraceptives? e.g. Condoms, oral contraceptives, IUD**
   - Yes
   - No

10. **If so, within the last year what has been your preferred hormonal contraceptive?**
    - Oral contraceptives (Birth Control pill)
    - Contraceptive implants
    - Hormonal skin patch
    - Intrauterine devices (IUD)
    - Vaginal rings
    - Depo-Provera Injections
    - None

11. **Within the last year, did you use a condom during sexual intercourse?**
    - Yes
    - No

12. **If no, for what reason? Due to…**
    - Personal preference
    - Use of hormonal contraceptive
    - Other

Thank you for your response!
(Displayed on end screen)

HSC4730 Research Proposal

Percent Effort Form

Please note the following:

The total Percent Effort must equal 100% for your group. So, for example, if there are 5 group members and you ALL contributed equally then you each receive 20%.

Each member of your group must sign (or digitally sign) the form

Name	Percent Effort	Signature
[illegible]	16.7	[illegible]
[illegible]	16.7	[illegible]
[illegible]	16.7	[illegible]
[illegible]	16.7	[illegible]
[illegible]	16.7	[illegible]
[illegible]	16.7	[illegible]
TOTAL PERCENT EFFORT →	100%	