CALIFORNIA STATE UNIVERSITY SAN MARCOS

THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE

MASTER OF PUBLIC HEALTH

TITLE: The Impact of COVID-19 on College Students’ Sexual Behavior

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DATE OF SUCCESSFUL DEFENSE: 12/08/2021

THE THESIS HAS BEEN ACCEPTED BY THE THESIS COMMITTEE IN

PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

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The Impact of COVID-19 on College Students’ Sexual Behavior

Ashley Labagnara

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Master of Public Health- Health Promotion and Education
ABSTRACT

To examine college students’ sexual behavior during the COVID-19 pandemic, an online survey was conducted, in which 80 college students answered. Results showed that there was a small change in sexual behaviors such as (1) number of sex partners, (2) frequency of sexual intercourse, (3) masturbation, (4) use of porn, and (5) use of condoms. Although odds ratios were not statistically significant, Graduates were more likely to report a change in number of sexual partners, [OR=1.04, 95% CI= 0.6-1.94], and porn use [OR=1.12, 95% CI= 0.66-1.90]. Undergraduates were more likely to report a change in the frequency of sexual intercourse [OR=1.08, 95% CI=0.75-1.55] and condom use [OR=1.31, 95% CI=0.90-1.92]. Females reporting a change in the frequency of sexual intercourse is 7% higher than Males reporting change [OR=1.07, 95% CI= 0.91-1.27]. Females were more likely to report a change in masturbation than Males [OR=1.06, 95% CI=0.90-1.26], while Males were more likely to report a change in condom use than Females [OR=1.41, 95% CI=0.42-4.76]. Additionally, 45 participants experienced some level of fear of contracting COVID-19 during a sexual encounter. The people who experienced changes number of sex partners [OR=1.57, 95% CI= 1.08-2.28], frequency of sexual intercourse [OR=1.18, 95% CI=], masturbation [OR=1.29, 95% CI= 0.86-1.92], and use of porn [OR= 1.27, 95% CI=0.85-1.90] were more likely to report fear of contracting COVID-19 during a sexual encounter. While these results do align with previous studies, a larger sample size is needed to strengthen the validity of these findings. Universities should use this data as preliminary information about to promote sexual health and COVID-19 education programs on campus.
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ACKNOWLEDGEMENTS

Foremost, I would like to thank God for the many blessings that He has bestowed upon me. Through trial and tribulations, faith and prayer has brought me to where I am today. “For when I am weak, then I am strong” (2 Corinthians 12:10).

I would like to thank my Thesis Chair, Dr. AsherLev Santos, for his guidance throughout this research process. Dr. Santos’ patience and wisdom guided me to the completion of this paper. I am eternally grateful for his never-ending support and could not imagine a better Chair.

I would also like to thank my family for supporting me and encouraging me to finish my degree. I especially want to acknowledgment my aunt, Amanda, for being my biggest role model and inspiration. Since I was a little girl, you have inspired me more than words can explain.

Lastly, I would like to acknowledge my mother and guardian angel, Amy Labagnara. I know that you are watching in Heaven and walk beside me in spirit every day. I love you always.
INTRODUCTION

The purpose of this paper is to investigate how COVID-19 impacted the sexual behaviors of college students in the United States. This study sought to answer whether sexual behavior among students changed, and if fear of contracting COVID-19 might have played a role in these changes. I chose to conduct this project because I identify with the student population that was rocked by the social changes caused by the pandemic-related lockdown. Not only did the pandemic change the styles of education, but it also changed the way students were able to interact with each other. I also chose to conduct this project because sexual health is extremely important to college students, who are susceptible to unplanned pregnancy and STIs. I felt that this project could positively add to the growing research about college students’ sexual health and behavior.

Research Aim:

Investigate the impact of COVID-19 on the sexual behavior among college students using an online survey.
BACKGROUND

Historical Background

COVID-19 is a respiratory disease caused by SARS-CoV-2 (CDC, 2019). It is spread from person to person through respiratory droplets (CDC, 2019). In December of 2019, the novel Coronavirus (COVID-19) was detected in Wuhan, China. By March 2020, the World Health Organization (WHO) had declared COVID-19 a pandemic affecting nearly every nation. As of April 2022, there have been over 80 million cases of COVID-19 and more than 989,000 deaths in the United States. As of November 2021, there have been roughly 8.2 million cases of COVID-19 among the 18-29 age group (CDC, 2021). This age group accounts for the second highest percentage of COVID-19 cases. (CDC, 2021).

Because of the virus’ lethality, governments around the world implemented country-wide stay-at-home orders in early 2020. In March of 2020, California issued the first stay at home order in the U.S., and all other states soon followed. While businesses closed, schools and universities transitioned to virtual instruction. By April 1st, 2020, colleges across the US transitioned to online instruction, and most students had to leave their campuses (Firkey et al., 2020). In a study population of 212 students across the U.S., 76% of students had reported that they had to leave their campuses by April 1st, 2020 (Firkey et al., 2020), and another study reported that roughly 73% of college students reported living with at least one parent by the end of April 2020 (Cohen et al., 2020). Virtual instruction changed the life of many college students. With universities and dorms being closed, many students moved back home, and social life such as Greek life, parties, sports events, and bars/clubs came to a halt.

In the study conducted by Firkey et al. (2020), 16.5% of students had reported experiencing COVID-19 symptoms, and 11.3% had tested positive for the virus. Similarly,
Cohen et al. (2020) found that 35% of the student participants had experienced COVID-19 symptoms in the Spring of 2020. Of those who had symptoms, only 4.7% got tested for COVID-19 while 85.6% did not attempt to get tested. Among this same population of students with symptoms, 46.9% stayed home while having symptoms, while 30.1% still attended class, 14.5% went to work, and 13.7% attended social gatherings (Cohen et al., 2020). Upon the reopening of college campuses, the CDC identified “institutions of higher education” as “settings where incidence among young adults increased during August 2021” (Leidner et al., 2021). Leidner et al. (2021) found that counties with virtual-instruction institutions had a 17.9% decline of average COVID-19 incidence in the 21 days before and after the start of classes, contrasting with counties that had in-person learning universities, who experienced a 56.2% increase in cases. These statistics reveal the risk of students contracting and spreading the virus, as well as reveal attitudes that could have contributed to this transmission. These statistics indicate that many college students did not adhere to CDC social distancing guidelines and could have contributed to the high prevalence rates of COVID-19 in the 18-29 age group. Not only do these statistics reveal information about risk and attitudes of college students surrounding COVID-19, but they can also provide insight into students’ sexual and dating behavior during this time.

**Sexual Behavior**

With the change in societal norms over the past year, sexual behaviors of college students could have changed as well. Evidence of this change was reported in a 2020 study conducted on college students across the U.S., in which 52% of college students reported a decrease in opportunity to have sex and 57% reported a decrease in the frequency of sexual intercourse (Firkey et al., 2020). Furthermore, this study reported that 51.9% of students reported no change in number of sex partners, while 38.6% reported a change. (Firkey et al., 2020). Interestingly
though, the use of dating apps of students was reported to be unchanged during the pandemic. This study did show that there was a difference in behavior among students in monogamous relationships versus students in non-monogamous relationships. Although there are very few studies done of sexual behavior during the COVID-19 pandemic, Firkey et al. (2020) suggests that sexual behavior has been affected mainly for students in non-monogamous relationships.

On the contrary, COVID-19 rates and STI rates suggest that sexual activity might not have changed all that much, and if it did change, activity increased. In October of 2021, the CDC released a report of national trends of sexually transmitted diseases (STDs) during the COVID-19 pandemic. This national study compared STD rates in 2020 to rates in 2019. Pagaoa et al. (2021) found that rates of STDs were drastically lower in March-April 2020 than in comparable weeks of 2019. However, rates of gonorrhea and syphilis increased in the later months of 2020, on track to match or even surpass STD rates of 2019 (Pagaoa et al., 2021). Researchers speculate that the dip in rates in 2020 were a result of national stay-at-home orders, in which businesses, including medical offices, closed. The closure of medical offices likely decreased STD screening and medical visits.

College is an important time in many students’ lives where they not only get an education, but they make new connections and friendships. Oftentimes, college is a new social experience for students, giving them their first life experiences of independence and making critical decisions. Therefore, it is expected that a societal change brought by the COVID-19 pandemic would affect how students build relationships and interact with one another. It is also expected that the effect on social relationships would change students’ sexual behavior. However, how sexual behavior has changed is largely still unknown. While the closure of schools, bars, sports, restaurants, and other social opportunities might have decreased students’
sexual activity, transition to virtual life, could have provided students with more free time to increase sexual activity.

**Current Research**

During the time of this research project, the Firkey et al. (2020) study was the only one of its kind that had occurred in the U.S., and its sample size of 212 students is not enough to conclude that the study is representative of all college students. Additionally, this study fails to account for possible reasons that could have contributed to changes in student’s sexual behavior. In addition to social restrictions, other factors such as fear of contracting the virus could play a role in changes in behavior. Further research around the impact of COVID-19 on students’ sexual behavior should be studied to understand how this might impact their sexual and reproductive health.

This population is particularly important to study because most of this population are of child-bearing age and are sexually active. The average age range of college students is 18-24, the same age range that makes up nearly 50% of sexually transmitted infection (STI; used synonymously with STD) cases in the United States (CDC, 2021). This essentially means that college students have a higher risk of contracting STI’s, experiencing unintended pregnancies, and experiencing adverse sexual and reproductive health problems.

This study will be the first of its kind to study how sexual behavior of college students in the United States has changed throughout the duration of the COVID-19 pandemic. Data from this study can be used by colleges in the U.S. to determine the need for sexual health programs and interventions during virtual learning and upon students’ return to campus. Pagaoa et al. (2021) highlights the importance of providing STD surveillance and prevention activities. The
same node of importance should be applied to studying sexual behavior in college students. Studies like Patagoa et al. (2021) provide an example of the importance of universities continuing to offer medical services and health promotion to students, even amid a global pandemic. Studying sexual behavior of students can aid universities in the planning of health promotion activities that can continue to prevent STDs and promote routine STD screening.

**Theory of Planned Behavior**

The Theory of Planned Behavior is a great public health tool to take into consideration when studying individual behavior such as college students’ sexual behavior. The Theory of Planned Behavior says that an individual’s behavior, or intentions, are based off attitudes about the specific behavior, subjective norms, and perceived behavioral control (Vega et al., 2019). This study takes into consideration the how attitudes around COVID-19 and sex might influence sexual behavior among students during the pandemic. Subjective norms influenced by friends, roommates, and family could play a role in sexual behavior. Lastly, behavioral control such as the ability to social distance during the pandemic, or the intention to practice safe sex could have influenced student’s behavior. According to findings by Lin et al. (2021), subjective norms and perceived behavioral control had a significant effect on safe sexual behavior intentions of college students. Based on the Theory of Planned Behavior, Universities and other organizations can use comprehensive sex education and other harm reduction strategies to change the attitudes, subjective norms, and intention of college students to influence them to practice safe sex.

Studying sexual behavior can have many public health implications, including how to improve sexual health and create educational programs that aid in harm reduction. In the past, we have seen sexual health programs that have been centered around abstinence, rather than
harm reduction and education. In fact, between 1982 and 2017, Abstinence Only Until Marriage (AOUM) Programs were given over $2 billion by the U.S. Federal Government. Unfortunately, these programs are ineffective and do not prevent sexual behavior, STIs, or unplanned pregnancies. On the contrary, in 2012, the CDC found that “Comprehensive risk reduction programs had favorable effects on self-reported current sexual activity, number of sex partners, frequency of sexual activity, use of protection (condoms and/or hormonal contraception), frequency of unprotected sexual activity, STIs, and pregnancy” (Santelli et al., 2017). Comprehensive sex education is vital to primary prevention of sexual health-related problems and should be used in educational institutions. This is especially important during a time such as the COVID-19 pandemic, when students’ sexual behavior could be impacted.
METHODS

Research Methods

To study the sexual behavior and attitudes of college students, an online survey was conducted. The study is a quantitative study that uses a series of numeric scales. Some questions from the survey were pulled from a similar study that was conducted in 2020 by Guanjian Li et al. (2020). The questionnaire has a series of demographic questions as well as questions about sexual behavior. The researcher used the Qualtrics platform to collect data, and SPSS to analyze the data.

Due to the COVID-19 social restrictions, using an online platform to conduct a survey was the best way to reach college students. Additionally, due to the survey’s content, I assumed that participants might feel more comfortable answering the survey online to ensure their identity remains anonymous.

Research Questions

1. **Question**: Has sexual behavior changed during the COVID-19 pandemic?

2. **Question**: Did fear of contracting COVID-19 play a role in sexual behavior change?

Research Hypotheses

1. **Null hypothesis**: Sexual behavior has not changed during the COVID-19 pandemic.

   **Alternative Hypothesis**: Sexual behavior has changed during the COVID-19 pandemic.

2. **Null hypothesis**: Of those who reported sexual behavior change, fear of contracting COVID-19 did not play a role.

   **Alternative Hypothesis**: Of those who reported sexual behavior change, fear of contracting COVID-19 did play a role.
Participants and Setting

Participants consisted of students, at least 18 years of age, who attended college at least one full semester during the COVID-19 pandemic (March 2020-March 2021). Participants were asked to complete a short, online survey. Demographics such as age, year in school, gender, sex, and sexual orientation were asked. Questions regarding sexual behavior, such as frequency of sexual intercourse, number of sex partners, quality of sexual desire, and use of dating applications were asked. Participants were not asked any identifying information, and the survey answers were anonymous. Before the survey began, participants had to read and electronically consent to the survey’s disclaimer.

Data Collection

Data was collected through an online survey, using the Qualtrics survey platform. The survey was distributed to various university resources such as faculty and advisors, and university clubs such as the SDSU black resource center, SDSU Planned Parenthood Generation Action Club, and the CSUSM Go MPH Club. The survey was also posted on various social media pages such as university Facebook pages, and Instagram. Researchers attempted to use the snowball method by asking participants to share the survey with their peers and classmates. The survey was open for one week. The sample survey for this study is attached in the appendix.

Research Ethics

This study will not cause harm to participants and will ensure confidentiality by keeping participant responses anonymous. The first page of the survey has a disclosure statement stating the contents of the survey, the length of the survey, the minimum age requirement to take the survey, and a statement saying that the survey will be anonymous. Before being able to start the survey, respondents had to read the disclaimer and electronically consent to it.
Analytic Approach

In this current study, sexual behavior was classified by partner-involved activities. Sexual behaviors that were studied were masturbation, use of porn, use of condoms, frequency of sexual intercourse, and number of sex partners. Masturbation and porn use were studied as indicators of non-partner-involved activities, while condom use, frequency of sexual intercourse, and number of sex partners were classified as partner-involved activities. Behavior change was determined by either asking direct questions about change in specific behaviors, or comparing pre-COVID numbers to COVID numbers, such as numbers of sex partners and frequency of sexual intercourse.

The SPSS program was used to analyze data. All the data is quantitative. While most of the survey questions are straightforward numbers, there are a few Likert scales. Descriptive statistics were run on all questions. Some questions were coded to be able to run bivariate analysis. For example, indicators of behavior change were coded to “behavior change” and “no behavior change,” relationship status was coded to “in a relationship” and “single,” and class level was coded to “undergraduate” and “graduate.” For the first objective, odds ratios were calculated between various sexual behaviors and demographics, such as Behavior Change and Gender, and Behavior Change and Class Level.
RESULTS

Demographics

Participants were made of 71 females (83.5%), 11 males (12.9%), and 3 third gender/non-binary individuals (3.5%). Of those participants, 4 were American Indian or Alaskan Native (4.7%), 12 were Asian (14.1%), 9 were Black or African American (10.6%), 1 was Native Hawaiian or Pacific Islander (1.2%), 36 were white (42.4%), and 23 reported being “other” (27.1%). Roughly half (49.4%) of participants reported being of Hispanic, Latino, or Spanish origin. When asked about sexual orientation, 3 participants reported being Asexual (3.5%), 15 reported being Bisexual (17.6%), 61 reported being Heterosexual (71.8%), 4 reported being Homosexual (4.7%), and 2 reported being “other” (2.4%). Lastly, 8 participants were working on their associate degree (9.4%), 41 on their bachelor’s degree (48.2%), 32 on their master’s degree (37.6%), and 4 on their Doctoral degree (4.7%). This means that 49 students were undergraduates (57.6%), and 36 (42.4%) were graduate students.

Questions such as relationship status, employment status, and housing accommodations were asked in context of the COVID-19 pandemic. Participants reported that during the COVID-19 pandemic, between March 2020-March 2021, 40 were in a committed relationship (47.1%) and 45 were not in a committed relationship (52.9%). Participants reported that during the same time period, 26 were employed full time (30.6%), 29 were employed part time (34.1%), 27 were unemployed (31.8%), and 3 were self-employed (3.5%). Participants were asked about their housing accommodations both before and during the COVID-19 pandemic. Participants reported that before the pandemic, 3 lived in campus dorms (3.5%), 43 lived with parents
(50.6%), 25 lived with roommates (29.4%), and 12 lived alone (14.1%). During the pandemic, 55 participants reported living with parents (64.7%), 15 reported living with roommates (17.6%), and 13 reported living alone (15.3%).

*Table 1. Descriptive Statistics*

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
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<tr>
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<td><strong>Age</strong></td>
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<td>Bisexual</td>
<td>61</td>
<td>71.8%</td>
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<tr>
<td>Other</td>
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<tr>
<td>Prefer not to say</td>
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<td>Asian</td>
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<td>Black or African American</td>
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<tr>
<td>Other</td>
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<td>47.1%</td>
</tr>
<tr>
<td>Committed non-monogamous</td>
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</tr>
<tr>
<td>Not in a committed relation</td>
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<td>3.5%</td>
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<td>4.7%</td>
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<tr>
<td>Living with parents</td>
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<tr>
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<td>14.5%</td>
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<tr>
<td><strong>House during COVID-19</strong></td>
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<td>Campus dorms</td>
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<td>0%</td>
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<td>Living with parents</td>
<td>55</td>
<td>64.7%</td>
</tr>
<tr>
<td>Living with roommates</td>
<td>15</td>
<td>17.6%</td>
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Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>N</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Living alone</td>
<td>13</td>
<td>15.3%</td>
</tr>
</tbody>
</table>

**Behavior Change**

Reported changes were found in all behaviors measured. 16 participants reported a change in the number of sex partners (18.8%) while 69 did not report a change, 40 participants reported a change in the frequency of sexual intercourse (47.1%) while 45 did not (52.9%), 40 reported a change in masturbation (47.1%) while 45 did not (52.9%), 24 reported a change in the use of porn (28.2%) while 61 did not (71.8%), 17 reported a change in condom use (20%) while 67 did not report a change (78.8%). Of those who did report a change in these behaviors, 4 participants reported an increase in the number of sex partners during the pandemic (4.7%), while 12 reported a decrease (14.1%). 23 participants reported an increase in the frequency of sexual intercourse (27.1%), while 17 reported a decrease (20%). 32 participants reported an increase in the frequency of masturbation (37.6%), while 8 reported a decrease (9.4%). 17 participants reported an increase in the use of pornography (20%), while 7 reported a decrease (8.2%). Lastly, 9 participants reported an increase in condom use (10.6%), while 8 reported a decrease (9.4%).
Table 2: Behavior Change

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Change</th>
<th>No Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Sex Partners</td>
<td>16</td>
<td>18.8%</td>
</tr>
<tr>
<td>Frequency of Sexual Intercourse</td>
<td>40</td>
<td>47.1%</td>
</tr>
<tr>
<td>Masturbation</td>
<td>40</td>
<td>47.1%</td>
</tr>
<tr>
<td>Porn</td>
<td>24</td>
<td>28.2%</td>
</tr>
<tr>
<td>Condom Use</td>
<td>17</td>
<td>20%</td>
</tr>
</tbody>
</table>

After stratifying data by class level, I analyzed behavior change among Undergraduate students and Graduate students. Although the odds ratios were not statistically significant, trends indicated that Graduates were 4% more likely to report a change in the number of sexual partners than Undergraduates [OR=1.04, 95% CI= 0.6-1.94]. Graduates were 1% more likely to report a change in masturbation than Undergraduates [OR=1.01, 95% CI=0.61-1.65]. Graduates were 12% more likely to report a change in porn use than Undergraduates [OR=1.12, 95% CI= 0.66-1.90]. Graduates were 8% less likely to report a change in the frequency of sexual intercourse than Undergraduates [OR=1.08, 95% CI=0.75-1.55]. Graduates were 31% less likely to report a change in condom use than Undergraduates [OR=1.31, 95% CI=0.90-1.92].
Sexual behavior also differed among gender. Odds ratios were not statistically significant but did reveal a few trends in gender differences. Females were 1% more likely to report a change in the number of sexual partners during the COVID-19 pandemic than Males [OR=1.00, 95% CI= 0.80-1.25]. Females were 7% more likely to report a change in the frequency of sexual intercourse than Males [OR=1.07, 95% CI= 0.91-1.27]. Females were 6% more likely to report a change in masturbation than Males [OR=1.06, 95% CI=0.90-1.26]. Females were 1% more likely to report a change in porn use than Males [OR=1.01, 95% CI=0.83-1.21]. Females were 41% less likely to report a change in condom use than Males [OR=1.41, 95% CI=0.42-4.76]. It is important to note that these calculations excluded three non-binary responses.

**Fear of Contracting COVID-19**

In the survey, participants were asked to rate their level of fear of contracting COVID-19 during a sexual encounter. 16 participants reported being very fearful (18.8%), 29 reported being slightly fearful (34.1%), and 40 participants reported being not fearful at all (47.1%). Essentially, 45 participants, or over half, reported some level of fear of contracting COVID-19 during a sexual encounter.

<table>
<thead>
<tr>
<th>Level of Fear of Contracting COVID-19 During a Sexual Encounter</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Fearful</td>
<td>16</td>
<td>18.8%</td>
</tr>
<tr>
<td>Slightly Fearful</td>
<td>29</td>
<td>34.1%</td>
</tr>
</tbody>
</table>
People who reported a change in the number of sex partners were 57% more likely to be fearful of contracting COVID-19 during a sexual encounter than people who reported no change [OR=1.57, 95% CI=1.08-2.28]. People who reported a change in the frequency of sexual intercourse were 18% more likely to be fearful of contracting COVID-19 during a sexual encounter than people who reported no change [OR=1.18, 95% CI= 0.79-1.76]. People who reported a change in masturbation were 29% more likely to be fearful of COVID-19 during a sexual encounter than people who reported no change [OR=1.29, 95% CI= 0.86-1.92]. Those who reported a change in use of porn were 27% more likely to be fearful of COVID-19 during a sexual encounter than people who reported no change [OR= 1.27, 95% CI=0.85-1.90]. Additionally, Females were 4% more likely to report fear of contracting COVID-19 during a sexual encounter than Males [OR=1.04, 95% CI= [0.87-1.23]. These odds ratios were not statistically significant but did provide indications that fear of contracting COVID-19 did play a role in behavior change.
DISCUSSION

Behavior Change

Although the amount of change varied by behavior, the results are consistent with previous studies that show a change in sexual behavior during COVID-19. These behavioral changes were expected due to mass societal changes that occurred between March 2020-2021. Societal changes included stay-at-home orders, virtual instruction, and closed dorms. Most participants who reported behavior change reported increases in all five behaviors. In addition to social restrictions, a likely reason for change in sexual behavior is housing accommodation. During the pandemic, many students in the survey reported moving in with their parents. The change between living in dorms or with roommates to living with parents could have impacted students’ sexual behaviors. The change in housing accommodations likely changed opportunities for partner-involved sexual behavior and could explain the reported increases of masturbation and porn use. These trends closely align with Firkey et al. (2020) findings that 52% of college students reported a decrease in opportunity to have sex and 57% reported a decrease in the frequency of sexual intercourse (Firkey et al., 2020). Furthermore, this study reported that 51.9% of students reported no change in number of sex partners, while 38.6% reported a change.

After looking at behavior change among all students, I decided to look at behavior change among different groups such as class level and gender. Surprisingly, I found that most behavior change did not greatly differ between genders or class levels. While behavior change was found in the general student body overall, specific characteristics of gender and class level did not experience behavior change. Behavior change does not differ by gender or class level but could have something to do with perceived susceptibility of contracting the virus.
Gender Trends

Odds ratios revealed that females were less than 10% more likely to report changes in number of sex partners, frequency of sexual intercourse, masturbation, and porn use than males. Even more so, there was less than a 1% odds ratio difference between Females and Males reporting a change in number of sex partners and use of porn during the COVID-19 pandemic. These odds ratios indicated that sexual behavior change did not differ by gender. Among Females who reported a change in sexual behavior, most Females reported increases in both frequency of sexual intercourse and masturbation.

These results were rather unexpected due to previous research that has found that women reported more stress during the COVID-19 pandemic as well as reported more fear of contracting COVID-19 than men (Alsharawy et al., 2021). For this reason, it was expected that there would be more of a difference in behavior change between genders. More specifically, it was expected that women would experience a decrease in sexual activity due to the higher prevalence of stress and fear.

Class Level Trends

Odds ratios revealed that there was less than a 10% difference between Graduates and Undergraduates reporting changes in masturbation, number of sex partners, and frequency of sexual intercourse. However, Graduates were more than 10% likely to report changes in porn use, and less likely to report changes in condom use. Other than Graduates being 31% less likely to report condom use than Undergraduates, odds ratios indicated that there wasn’t a large difference in behavior change among class levels.

These results were also surprising because it was expected that there would be more behavior change among Undergraduate students. The reason for this expectation is that 32% of
full-time undergraduates live in on-campus housing (National Center for Education Statistics, 2017), in which many of them likely would have had to move when the pandemic caused schools to close doors. Thus, it was expected that moving out of on-campus housing might have decreased opportunity for sexual intercourse and caused undergraduates to report more sexual behavior change.

**Attitudes & Behavior**

Perceived susceptibility to contracting COVID-19 is a major indicator college students’ behavior, not only in respect to adhering to COVID-19 guidelines, but sexual behavior as well. In this study, roughly 47% of participants reported having “no fear at all” of contracting COVID-19 during a sexual encounter; a similar number to the 46% of students who reported not adhering to social distancing guidelines in the Firkey et al. (2020) study. Those who did not report fear were more likely to report changes in condom use and less likely to report changes in all other behaviors.

These attitudes and behaviors could provide an explanation as to why STI rates were essentially unchanged through most of the months of the pandemic. STI rates declined in the early months of the pandemic, likely due to closed medical centers and less STI screening. However, in the middle to end months of December 2020, STI rates were equal to or more than rates in previous years. These STI trends align with the factor of fear and attitudes that were found in this study. Almost half of the participants in this study were not fearful of COVID-19, and most participants reported that there was no change in number of sex partners. Interestingly, most of the participants who did report behavior change, reported an increase in the frequency of sexual intercourse. This increase in frequency paired with the lack of fear of the virus, as well as
the unchanging number of sex partners could explain why there was a lack of change in STI rates during the pandemic.

**Public Health Implications**

This study found that students did experience sexual behavior change during the COVID-19 pandemic. The degree of that change varied by behavior. Behavior change did not greatly differ between gender, as odds ratios determined that there was less than a 10% likelihood of Females reporting change than men. This is the same for class level, as odds ratios revealed that there was less than 15% difference in behavior change between Graduates and Undergraduates. Lastly, the study showed that fear of contracting COVID-19 did play a role in some students’ sexual behavior. These findings are helpful in determining what harm reduction strategies might benefit college students.

College-aged students make up large case rates of COVID-19 & STIs. Attitudes and behavior of students during the COVID-19 pandemic are particularly important to understand in order to control the spread of both COVID-19 and STIs. While there is a risk contracting an STI during sexual activity, COVID-19 heightened that risk by also introducing the risk of contracting COVID-19. Because STIs and COVID-19 are both infectious diseases, Gravett & Marrazzo (2021) state that harm reduction strategies for STIs coincide with harm reduction strategies of COVID-19. Some of these strategies include barrier protection (masks and condoms), vaccines, screenings, and comprehensive education. Because most college students are sexually active, it is important to continue to provide sexual health services, even amid a pandemic.

It is important for universities and institutions to study the sexual behavior of college students during this time so that they can understand how students’ sexual behavior might impact their sexual health and susceptibility to catching COVID-19. This information can be used to
implement harm reduction programs, campaigns, and services to students. Although many health
organizations are focused on minimizing the spread of COVID-19, universities and health
organizations should not forget to continue their efforts in promoting sexual health. In a survey
conducted by the Guttmacher Institute, 30% of respondents in 2020 and 19% of respondents in
2021 reported that had to delay their reproductive health services or experienced trouble getting
contraceptives because of the COVID-19 pandemic. In addition, during a review of STI rates
during 2020, the CDC found that rates could have been impacted by the lack of STI screening
available during the months that the country experienced stay-at-home orders (CDC Division of
STD Prevention, 2022). Thus, university clinics and other health care providers should ensure
that students have access to reproductive and sexual health services, including contraceptives,
pap smears, STI and HIV screenings, and PrEP. Lastly, universities and community
organizations should continue to implement campaigns that promote and provide sexual health
resources in adaptation with orders of the COVID-19 pandemic, such as hosting online sex
education events, sending students packages with contraceptives, brochures, and at-home testing
kits. Although the pandemic has changed the way services are provided, universities, community
organizations, and other health care providers still have a duty to provide essential sexual and
reproductive health services.
CONCLUSION

Strengths

The main strength of this research project is that the questionnaire was anonymous and potentially yielded more accurate results since students did not have to identify themselves. Another strength of this project is that it had a diverse pool of participants. Roughly half of the participants identified as being of Hispanic origin. While most participants were Caucasian, they made up less than half of the participant pool, followed by “other,” Asian, Black or African American, Native American, and Hawaiian or Pacific Islander. This racial and ethnic diversity strengthens the research, because it reflects the behavior of a realistic student body demographic. Lastly, this study was quantitative, making the survey results relatively straightforward to analyze.

Limitations

This study does have some limitations. The first is that this survey is self-designed with influence from Guanjian Li et al. (2021), meaning that results are not based on a replicated questionnaire or scale. The second limitation is that this study was open for a short time and has a relatively small sample size, which could lead to type II errors when analyzing and/or stratifying the data. This small sample size could have also impacted the width of the odds ratio confidence intervals.

Future Research

This study has provided a preliminary look into the sexual behavior of college students during the COVID-19 pandemic. Further research is needed to fully understand the sexual behavior of college students during this time, as well as the impacts that the pandemic and sexual behavior has had on college students’ sexual health.
First, further research is needed to understand the direct relationship between college student’s sexual behavior and STI rates during the COVID-19 pandemic. This study did not ask participants about history of STIs as it relates to the pandemic. Rather, it used national STI rates to add potential insight into the sexual behavior of college students. Thus, researchers should continue to deepen the research around STIs among college students during the pandemic.

Next, this area of research should be conducted with a larger sample size to strengthen the results of the data and potentially narrow the confidence intervals among the odds ratios of behavior change and various factors.

Lastly, more research is needed to determine how sexual behavior might have varied between gender and sexuality. This survey had relatively small sample size of men and non-binary individuals, which made the data difficult to stratify and analyze. The same can be said for sexuality, as there was a relatively small sample size of non-heterosexual individuals.
REFERENCES


(http://dx.doi.org/10.15585/mmwr.mm7001a4external icon)


Start of Block: Block 1

DISCLAIMER Dear Student,

My name is Ashley Labagnara, and I am a Public Health Graduate student at California State University San Marcos. You are invited to participate in a research study on sexual behavior during the COVID-19 pandemic. You were selected as a possible participant because you were a college student during the COVID-19 pandemic. Please read this form carefully and ask any questions you may have before agreeing to be in the study. You must be 18 or older to participate in the study.

KEY INFORMATION ABOUT THIS RESEARCH STUDY:
The following is a short summary of this study to help you decide whether to be a part of this study. Information that is more detailed is listed later on in this form. The purpose of this study is to determine whether both sexual and non-sexual behavior has changed or been impacted by the COVID-19 pandemic. You will be asked to complete a short, online survey. We expect that this survey will take you no longer than 5 minutes. The primary risk of participation is the potential of being uncomfortable with answering questions about sexual behavior. The main benefit is that you will be participating in a unique study that aims to advance knowledge about students' sexual behavior.

STUDY PURPOSE:
The purpose of this study is to determine whether both sexual and non-sexual dating behavior has changed during the COVID-19 pandemic.

NUMBER OF PARTICIPANTS:
If you agree to participate, you will be one of 100-200 participants among colleges across the US and CSUSM who will be participating in this research.

PROCEDURES FOR THE STUDY:
If you agree to be in the study, you will do the following: Complete a short online survey using the Qualtrics platform. This survey should take no longer than 5 minutes and can be accessed by computer or mobile phone. The survey will contain questions about sexual behavior within the past year.
There are minimal risks and inconveniences to participating in this study. These include:
• Participants may be uncomfortable answering the survey or interview questions.
• The time participants spend for participating in the study might be considered inconvenience.

SAFEGUARDS:
To minimize these risks and inconveniences, the following measures will be taken:
• The survey will not exceed 22 questions to keep timing inconveniences to a minimum.
• Answers will be anonymous and there will not be any identifying questions.
• Answers will not be shared outside of the study.

CONFIDENTIALITY:
Your responses will be anonymous, and the personal information is only accessed by the researcher or the research team who is doing the study. The results if this study may be used in reports, presentations, or publications but your name will not be used. Results will only be shared in aggregate form. Additionally, data will be stored on a password-protected computer, in which only the researcher, thesis chair, and thesis committee member will have access. Data will be retained for 3 years after the project is completed and digital files will then be erased.

VOLUNTARY PARTICIPATION:
Taking part in this study is voluntary. You may choose not to take part or may leave the study at any time. Leaving the study will not result in any penalty. Your decision whether or not to participate in this study will not affect your current or future relations with any classes, schools, or clubs that you are involved with.

BENEFITS OF TAKING PART IN THE STUDY:
There are no direct benefits to participation in this study, however, your participation will help researchers and universities to understand how sexual and dating behavior might have changed during the past year, as well as help them to determine the health services and programs that should be prioritized upon the reopening of universities.

PAYMENT OR INCENTIVE:
You will not receive payment for taking part in this study.

CONTACT INFORMATION:
If you have questions about the study, please e-mail Ashley Labagnara at labag001@cougars.csusm.edu, and the faculty advisor, Dr. AsherLev Santos at asantos@csusm.edu. You will be given a copy of this form for your records. If you have any questions about your rights as a participant in this research or if you feel you have been placed at risk, you can contact the IRB Office at irb@csusm.edu or (760) 750-4029.
PARTICIPANT’S CONSENT:
By "accepting" below, you are giving consent to participate in the study.

- Accept (1)
- Deny (2)

End of Block: Block 1

Start of Block: Default Question Block

Did you attend at least one semester of college between March 2020 and March 2021?

- Yes (1)
- No (2)

Q2 What gender do you identify with?

- Female (1)
- Male (2)
- Non-binary / third gender (3)
- Prefer not to say (4)

Q3 What is your age?

- 18-21 years old (1)
- 22-25 years old (2)
- 26-29 years old (3)
- 30+ years old (4)
Q4 What is your sexual orientation?

- Asexual (1)
- Bisexual (2)
- Heterosexual (3)
- Homosexual (4)
- Other (5)
- Prefer not to say (6)

Q5 Are you of Hispanic, Latino, or Spanish origin?

- Yes (1)
- No (2)

Q6 How would you describe yourself?

- American Indian or Alaska Native (1)
- Asian (2)
- Black or African American (3)
- Native Hawaiian or Pacific Islander (4)
- White (5)
- Other (6)
Q7 What was your relationship status during the COVID-19 pandemic?

- In a committed monogamous relationship (1)
- In a committed non-monogamous relationship (2)
- Not in a committed relationship (3)

Q8 What was your employment status during the COVID-19 pandemic?

- Employed full time (40 or more hours per week) (1)
- Employed part time (up to 39 hours per week) (2)
- Unemployed (3)
- Self-employed (4)
- Retired (5)

Q9 Which college degree are you currently working on?

- Associates degree (1)
- Bachelor’s degree (2)
- Master's degree (3)
- Doctoral degree (4)
Q10 What was your housing accommodation before the COVID-19 pandemic?

- Campus dorms (1)
- Living with parents (2)
- Living with roommates (3)
- Living alone (4)

Q11 What was your housing accommodation during the COVID-19 pandemic?

- Campus dorms (1)
- Living with parents (2)
- Living with roommates (3)
- Living alone (4)

Q12 How many people did you engage in sexual activity in 2019 (the year before the COVID-19 pandemic)?

- 0-2 (1)
- 3-5 (2)
- 6-8 (3)
- 9+ (4)
Q13 How many people did you engage in sexual activity in 2020 (the year of the COVID-19 pandemic)?

- 0-2 (1)
- 3-5 (2)
- 6-8 (3)
- 9+ (4)

Q14 On average, how often did you engage in sexual intercourse before the COVID-19 pandemic?

- Daily (1)
- 4-6 times a week (2)
- 2-3 times a week (3)
- Once a week (4)
- Never (5)

Q15 On average, how often did you engage in sexual intercourse during the COVID-19 pandemic?

- Daily (1)
- 4-6 times a week (2)
- 2-3 times a week (3)
- Once a week (4)
- Never (5)
Q16 How did your masturbation frequency change during the COVID-19 pandemic?

- Increased (1)
- Decreased (2)
- Unchanged (3)

Q17 How did your use of dating apps change during the COVID-19 pandemic?

- Increased (1)
- Decreased (2)
- Unchanged (3)

Q18 How did your use of pornography change during the COVID-19 pandemic?

- Increased (1)
- Decreased (2)
- Unchanged (3)

Q19 How did your use of condoms change during the COVID-19 pandemic?

- Increased (1)
- Decreased (2)
- Unchanged (3)
Q20 How did your sexual desire change during the COVID-19 pandemic?

- Increased (1)
- Decreased (2)
- Unchanged (3)

Q21 Rate your level of fear regarding contracting COVID-19 during a sexual encounter.

- Very fearful (1)
- Slightly fearful (2)
- Not fearful at all (3)

Q22 Rate your level of fear of non-sexual dating during the COVID-19 pandemic?

- Very fearful (1)
- Slightly fearful (2)
- Not fearful at all (3)

End of Block: Default Question Block