Sexually Transmitted Infections and the 65 and Older Population in Clark County, Nevada: Knowledge and Perceived Risk

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Abstract

Sexually transmitted infections (STI) can impact all persons. Since 2000, the number of STIs has steadily increased among persons aged 50 years and older in the United States (Purpora, 2012). The purpose of this study was to use the Sexual Health Model to examine predictors of perceived risk of STIs, STI knowledge, sexual activity, comfort talking to and frequency of which sex was discussed with a physician in persons 65 years of age and older residing in Southern Nevada. A 30-item survey was developed to assess the relationships. Data analysis included descriptive statistics, chi-square/correlation, and multiple linear regression. Participants (n=155) were mostly male (n=87), white (n=101), and married (n=106); 27% were still sexually active and 35.7% had ever been screened for STIs. STI knowledge score was significantly associated with perceived risk of contracting a STI; Medicare status was associated with comfort talking to a physician and being sexually active was associated with frequency of talking to a physician. This study is one of the few examining sexual health within the 65 and older population. Findings highlight the need for sexual health education and screening for older adults, especially between health care providers and patients.

Keywords: Sexual health; Sexual education; 65 and older

Introduction

People aged 65 and older are not the first group that comes to mind when discussing sexually transmitted infections (STIs). The assumption is that persons 65 and older are less sexually active than their younger counterparts, which is not always the case (Purpora, 2012). STIs do not discriminate against age, gender, or sexual preference; they affect persons from all types of backgrounds (ASHA, n.d.). Due to medical advancements, including medications, people are able to live longer, despite health issues, including sexual health issues (Howley, 2018). Since 2000, the prevalence of STIs has steadily increased among persons aged 50 years and older in the United States (Purpora, 2012). Between 2014 and 2017, persons over the age of 60 accounted for the biggest increase of in-office treatments for gonorrhea, syphilis, chlamydia, herpes simplex, hepatitis B, and other STIs, which was a 23% increase compared to previous years (Howley, 2018; Cohen, 2018). The rates of STIs increased by about 20% among Americans 45 years or older between 2015 and 2016; however, an increasing year-over-year trend has been observed since 2012 (Lilleston, 2018). There are many factors that are contributing to this increase which are discussed below.

Lack of Condom Usage

One of the biggest contributors to increased STI rates within the 65 and older population is lack of condom usage (Schwartz, 2010). This age group tends to associate condoms with the prevention of pregnancy and not the prevention of disease (Schwartz, 2010). Additionally, this group relied on other contraceptive methods, such as oral birth control, rather than condoms (Haupt, 2010). Women who are 65 years and older are post-menopausal, thus feel that pregnancy is no longer an issue; therefore, they perceive that a condom is not needed. However, many older adults fail to think about or perceive themselves at risk for an STI (Boyles, 2012; Bodley-Tickell et al, 2008).

An AARP study examined condom usage in heterosexual and homosexual Americans aged 50 and older. Their results indicated that overall, one out of five individuals used a condom regularly, whereas only 12% of men and 32% of women used condoms regularly (Schwartz, 2010; Boyle, 2012). A study conducted at Indiana University found men and women over the age of 60 had the lowest condom usage of any population (Pereto, 2018; Cohen, 2018),

and a study conducted at the University of Chicago found that 60% of women aged 58-90 did not use a condom the last time they engaged in sexual intercourse (Purpora, 2012). Whatever the reasoning, the literature shows the lack of condom usage among this population is a contributing factor to the increased rates of STIs (Schwartz, 2010).

Knowledge
Very little information exists on the knowledge of STIs for those aged 65 and older. Okuno, Fram, Batista, Barbosa, & Belasco (2012) found a relationship between gender and sexuality knowledge. Women aged 50 and older were found to be more knowledgeable in terms of sexuality, especially the transmission of STIs and AIDS (Okuno, Fram, Batista, Barbosa, & Belasco, 2012). No studies were found that exclusively examined men's knowledge in terms of sexuality.

Physiological Factors
Men often encounter erectile dysfunction as a result of aging or as a side effect of medications being taken for another chronic illness (Purposa, 2012). Erectile dysfunction is the inability to sustain an erection (Xu, Schillinger, Aubin, St. Louis, & Markowitz, 2001). The phenomenon of erectile dysfunction in men has resulted in numerous medications to alleviate the issue. These medications may have increased the number of sexually active men, increasing the number of persons at risk for contracting an STI (Xu, Schillinger, Aubin, St. Louis, & Markowitz, 2001). A positive outcome is the use of these medications has created opportunities for men to talk with their physician about their sexual health, including STIs, which may help to bring awareness to this issue (Purposa, 2012).

Baby Boomer Generation
Baby Boomers are defined as persons born between 1946 and 1964. The target population of this study is persons born in 1954 or earlier; therefore, a portion of the target population consists of the Baby Boomer generation. This population grew up in a time when experimenting with various sexual activities was encouraged. As older adults, these individuals are engaging in the same behaviors as they did when they were in their twenties (Pereto, 2018). Some of these behaviors include multiple sex partners; in fact, persons born around 1954 or before have the highest rates of extramarital affairs (Wolfinger, 2017). A study published in 2017 indicated 20% of Americans over the age of 55 have engaged in extramarital affairs, whereas only 14% of Americans under the

age of 55 have engaged in extramarital affairs (Bort, 2017). One potential reasoning for the increased rate of affairs is related to the social norms of the era in which this population became of age (Bort, 2017). Thus, persons 65 years of age and older may be carrying over their "sexual revolution" tendencies into their present-day lives, resulting in increased risk of contracting an STI.

Ageist Attitudes
Persons 65 years or older are often overlooked in terms of sexual health. Ageist attitudes, or a discrimination based on someone's age, cause many people to assume that persons 65 and older do not engage in sexual activities. These ageist attitudes can be found within
public health organizations and health care providers. For example, the Centers for Disease Control and Prevention (CDC) recommends screening for STIs in patients between the ages of 13 and 64 (Centers for Disease Control and Prevention, 2015).

Healthcare professionals are likely to follow the guidelines of the CDC. Thus, their recommendation to stop screening at age 65 is likely to lead to a large portion of healthcare professionals failing to discuss sexual activity and STI risks with older adult patients (Howley, 2018; Crawford, 2017). Additionally, since persons aged 65 and older are often not screened for STIs, they may be misdiagnosed with another disease/infection instead of an STI because their provider assumes that they are not sexually active. Through misdiagnosis, STI rates within the older adult population are likely to be underestimated (Imparato and Sanders, 2012).

Talking with Physicians
Many people over the age of 65 often do not feel comfortable talking about sex with their physician (Morton, Kim, & Treise, 2011). One study found that women reported their comfort level in talking to their physician was very low; therefore, they did not bring up any sexual health issues (Morton, Kim, & Treise, 2011). To make the conversation more difficult, the communication skills necessary to understand safe sex practices are less developed in persons 65 years of age and older compared to their young counterparts (Letvak and Schoder, 1996).

While sex education courses for adolescents have become common place in school curriculum, this was not the norm for many older adults (Purposa, 2012; Xu, Schillinger, Aubin, St. Louis, & Markowitz, 2001). Additionally, if persons 65 years of age and

older participated in a sex education class, it was over 45 years ago. A lot of the information presented in sexual education courses has changed since this target population has taken the course (Xu, Schillinger, Aubin, St. Louis, & Markowitz, 2001). It is possible that older adults, those 65 years of age and older in particular, maybe lacking the knowledge and skills associated with talking about sex (Xu, Schillinger, Aubin, St. Louis, & Markowitz, 2001). The lack of conversations is not entirely a result of patient lack of knowledge or comfort, Howley (2018) reported that physicians do not open the dialogue with their old adult patients either.

Theoretical foundation: The Sexual Health Model
These same factors that contribute to increasing STI rates in the 65 and older population can be found in the Sexual Health Model. Robinson et al. (2002) derived the Sexual Health Model from three main concepts:

> (1) key characteristics of an established sexological approach to comprehensive sexuality education, (2) literature-based recommendations for culturally specific, relevant, normative models of sexual health derived from the target community's experience, and (3) qualitative and quantitative research on the sexual attitudes, practices, and risk factors of various populations, as well as their context for safer-sex decision making (p. 45)

The Sexual Health Model contains ten constructs that are believed to be essential aspects of healthy human sexuality (Robinson et al., 2002). These ten constructs are: talking about sex, cultural and sexual identity, sexual anatomy functioning, sexual health care/safe sex, challenges associated with sex, masturbation and fantasy, body image, positive sexuality, intimacy/relationships, and spirituality (Robinson et al., 2002). This study focused on four constructs: talking about sex, intimacy and relationships, challenges, sexual healthcare/safer sex. These four constructs were chosen since they are the most represented in the published literature.

The purpose of this study was to use the Sexual Health Model to examine predictors of perceived risk of STIs, STI knowledge, sexual activity, comfort talking to and frequency of which sex was discussed with a physician in persons 65 years of age and older residing in Southern Nevada. The age of 65 was chosen because that is when individuals gain access to Medicare. Additionally, Medicare covers the cost of STI testing with no cost-share (Medicare Rights Center, n.d.). Understanding these intricacies of sexual health could aid in the development of prevention efforts and interventions to help promote sexual health, safer sex, and the prevention of STIs within the 65 and older population and increase awareness of this problem within Clark County, Nevada.

This study aimed to answer the following questions:

- What are the predictors of STI knowledge in persons 65 and older on their sexual risk behaviors in Clark County, Nevada?
- What are the predictors of perceived risk of contracting an STI in persons 65 and older in Clark County, Nevada?
- What are the predictors of talking to providers about STI prevention in persons 65 and older in Clark County, Nevada?

Methods
Study Design
This study was exploratory in nature. A cross-sectional design and convenience sample were used. Participants were asked to complete a 30-item survey focused on STI knowledge, perceived risk of contracting an STI, safe sex practices, and discussion of STIs with health care professionals. The survey was available in pencil and paper format and an online format. Due to the COVID-19 pandemic, recruiting participants in person was difficult because the target population of this study was at a higher-risk for COVID-19. Therefore, completing the online survey instead of in-person became an option for participants.

Study Population
Based upon a sample size estimator for a 95% confidence interval and 10% margin of error, a total of 87 surveys needed to be completed. The sample size estimator was calculated via a sample size calculator (Select Statistical Services, n.d.). Due to the likelihood of incomplete surveys, at least 150 persons were surveyed to increase the likelihood of obtaining 87 completed surveys.

The inclusion criteria for an individual to participate in the study was they be 65 years of age or older, living in Clark County, Nevada, and can read English. Persons excluded from this study included those under the age of 65, those residing outside of Clark County, Nevada, those unable to give consent, or those unable to answer survey questions. Individuals who were not their power of attorney were not able to participate due to legal reasons.

Methods of Recruitment and Data Collection

After University of Nevada, Las Vegas IRB approval (protocol number: 1459545-3) was received, data collection began. Data was collected in person and online. In person data collection occurred in a physician's office located in Las Vegas, Nevada. Participants were asked to complete the 30-item pencil and paper survey by the researcher during the triaging process since the survey asked about some personal information. Participants were given a verbal, general description of the purpose and nature of the study and survey. By completing the consent form, participants agreed to participate in the study. Participants were given a manila folder with the survey, incorporated informed consent form, clipboard, and pencil to complete the survey. The survey took participants approximately 15 to 20 minutes to complete. Participants were asked to put the completed survey back into the manila folder to ensure privacy and confidentiality. Upon completion of the survey, participation in the study ended. Participants were not compensated for their time.

To help with data collection during the COVID-19 pandemic, IRB approval was attained to modify the recruitment process to include online outreach via social media (Facebook, NextDoorApp, etc.). Potential participants were recruited via social media to complete the survey online hosted by Qualtrics. Targeted recruitment was done to identify potential participants known to be 65 or older. The online survey was in the same format as the paper survey, with the exception of the removal of one question. Since online participants were not completing the survey in the physician's office, the question relating to the reason for their physician's appointment was removed.

Study Instruments

Data was collected using a self-administered general STI-knowledge and perceived risk survey developed by the researcher consisting of 30-items. The survey was divided into five sections: Perceived Risk (5 questions), STI Knowledge (5 questions), Sexual Activity (5 questions), Risk Behaviors (8 questions), and Demographics (7 questions).

The first portion of the survey was the participant's perceived risk and susceptibility of contracting an STI of someone in a similar age category. These questions were adapted from a previous study (Pichon, 2000). Participants received a possible 0 to 19 points for responses to Questions 1-5. A score of 0 indicated no perceived risk, whereas a score of 19

indicated high perceived risk. STI knowledge was measured using survey questions adapted from VOICE/VOCES Pretest (CDC and Macro International Inc., 2008), the General Social Survey (GSS) (Smith et al., 2018) and the Behavioral Risk Factor Surveillance Survey (BRFSS) (CDC, 2018). Participants received one point for each correct answer. Scores could range from 0 to 5, with 0 being not knowledgeable about STIs and 5 being very knowledgeable about STIs.

The next portion of the survey asked about the participant's sexual activity and history of STI screening, if any. These questions were adapted from VOICE/VOCES Pretest (CDC and Macro International Inc., 2008). The last portion of the survey assessed participant's risk behaviors for contracting an STI, which included the number of sexual partners, condom usage, and communication about sexual health with a healthcare professional. These questions were adapted from GSS (Smith et al., 2018) and BRFSS (CDC, 2018).

The questions used in the survey were selected to examine constructs from the Sexual Health Model, in particular those relating to talking about sex, intimacy and relationships, challenges, sexual healthcare, and safer sex. No identifying information was collected to protect participants' confidentiality and maintain anonymity.

Data Analysis

All data were entered into and analyzed using SPSS version 25. Descriptive statistics, including frequencies, means, and standard deviations, were calculated to describe the sample. An STI knowledge score, which was a sum score with total possible points ranging from 0 to 5, was created. Each correct answer was one point. The perceived risk score was a sum score as well, with total possible points ranging from 0 to 19. Additionally, the race/ethnicity variable was collapsed into "white" versus "non-white". The risk behavior responses were collapsed to only two answer options instead of four, 'every time' and 'sometimes' responses were combined and the 'never' and 'not sure' options were combined.

The data were analyzed via chi-square/correlation tests with a 95% confidence interval to determine any statistically significant relationships. Variables which were statistically significant with the outcome variables were then entered into the multiple linear regression model to estimate the relationship between the dependent and independent variables, if any.

Results

A total of 155 surveys were completed and used for this study. One hundred fifty-two of the surveys were completed in pencil and paper format, 3 were completed online. The average age of participants was 75 (SD = 6.5) with a range of 65 to 93. More males (87) than females (66) females completed the survey. The majority of participants identified as White (n = 101). Most participants had some college (n = 39), and 106 participants identified their marital status as married. Table 1 provides more demographic data.

Table 1: Demographic Data from Participants Who Completed the Survey

Characteristics	Frequencies	Percentages
Gender		
Male	87	56.8
Female	66	43.1
Race/Ethnicity		
White	101	65.1
African American/Black	16	10.3
Hispanic	8	5.1
Asian American	17	10.9
Native American	3	1.9
Pacific Islander	5	3.2
Other	5	3.2
Medicare Enrollment		
Yes	139	92.1
No	12	7.9
Highest Level of Education		
Less than high school	6	3.8
High school graduate	28	18.1
Some college	39	25.3
2-year degree	25	16.2
4-year degree	22	14.2
Professional degree	27	17.5
Doctorate degree	7	4.5
Marital Status		
Married	106	68.8
Widowed	26	16.8
Divorced	14	10.3
Separated	2	1.2
Never married	5	3.2
Other	1	0.6

About 27% (n = 42) of the sample stated they were still sexually active with n = 17 of those being women and n = 25 being men. Of those 42 participants, only 15 said they were screened for an STI; however, most of the participants said the STI screening was over three years ago (n = 13). Additionally, a total of 18 participants reported they had been previously diagnosed with an STI. Of those 18 participants, 4 had chlamydia, 10 had gonorrhea, 1 participant had syphilis, and 5 participants had another type of STI. Approximately 13% of the sample stated they used condoms when engaging in sex since turning 65.

Table 2: Percentage of Correct Responses to STI Knowledge Questions

STI Knowledge Question	Correct Response	Frequencies	Percentage
Condoms only prevent pregnancy	False	127	81.9
You can tell your partner has an STI by physically examining them	False	110	70.9
Persons over the age of 60 comprise the largest increase of in-office treatments for STIs	True	19	12.2
People can reduce their chance of contracting an STI by using a condom every time they have sex	True	122	78.7
Medicare covers STI screenings	True	24	15.4

Table 3: Percentage of Responses to Perceived Risk Questions

Perceived Risk Question	Frequency	Percentage
Since turning 65, how often do you think about your chances of getting or having STI? (n = 154)		
Never	137	88.9
Occasionally	15	9.7
Frequently	2	1.2
What do you believe are the chances of someone your age getting a STI if they engage in oral, anal, or vaginal sex? (n = 154)		

Very Likely	36	23.3
Somewhat Likely	60	38.9
Not Very Likely	41	26.6
No Chance at all	17	11.0
How likely do you think someone your age can get a STI if they engage in unprotected sex? (n = 154)		
Very Likely	66	42.8
Somewhat Likely	58	37.6
Not Very Likely	25	16.2
No Chance at all	5	3.2
How likely do you think that someone your age can get an STI if they engage in sexual activities with multiple partners (n = 153)		
Very Likely	111	72.5
Somewhat Likely	31	20.2
Not Very Likely	6	3.9
No Chance at all	5	3.2
How likely do you think that someone your age gets a STI if they have sexual intercourse with a partner with known high-risk sexual behaviors (n = 153)		
Very Likely	127	83.0
Somewhat Likely	18	11.7
Not Very Likely	3	1.9
No Chance at all	5	3.2

Table 4: Percentage of Responses to Comfort and Frequency of Talking to Physicians About Sexual Health

Survey Question	Frequency	Percentage
Since turning 65, how comfortable are you talking with your physician about your sexual health, such as STIs/HIV testing, sexual dysfunction?		
Everytime	42	29.1
Sometimes	37	25.6
Never	47	32.6
Not Sure	18	12.5
Since turning 65, how often are you talking with your physician about your sexual health, such as STIs/HIV testing, sexual dysfunction?		
Everytime	10	6.8
Sometimes	38	26.2
Never	89	61.3
Not Sure	8	5.5

Research Question 1: What are the predictors of STI knowledge in persons 65 and older on their sexual risk behaviors in Clark County, Nevada?

The average STI knowledge score was 2.59 with a range of 0 to 5, out of a possible 5. The percentage of correct responses can be found in Table 2. The two questions that participants struggled to answer were related

to their age category, persons 65 years of age or older. Only 15% of participants knew that Medicare covered STI screenings. Whereas 12% knew that persons over the age of 60 comprise the largest increase of in-office treatments for STIs. Approximately 82% of participants had better knowledge related to general topics such as condom usage. Women's average STI knowledge score was 2.5, whereas men's average STI knowledge score was 2.6.

Pearson chi-square tests were performed to examine the relationship between STI knowledge and the dependent variables of sexual activity, risk behaviors, and demographic to determine if any statistically significant associations were present. A statistically significant association was found between the highest level of education and STI knowledge was significant, χ^2 (55, N = 155) = 74.53, p = 0.041. Once further testing was done via linear regression, no significant relationship was found (F (1, 152) = 2.54, p = 0.11), with an R^2 of 0.016 (results not shown).

Research Question 2: What are the predictors of perceived risk of contracting an STI in persons 65 and older in Clark County, Nevada?
A sum score was calculated to measure the participant's perceived risk of contracting an STI. The average perceived risk score was 14.31 with a range of 3 to 19, out of a possible 19. Table 3 indicates the frequencies and percentage of responses to the perceived risk questions.

Pearson chi-square was calculated between dependent variables: STI knowledge, risk behaviors,

demographics, and sexual activity and independent variable, perceived risk scores, to determine if any statistically significant associations were present. Two statistically significant associations were discovered between risk behaviors and perceived risk. The first statistically significant association was between length of having one main sex partner and perceived risk, χ^2 (56, N = 155) = 95.76, p = 0.001. The other statistically significant association was found between condom usage and perceived risk, χ^2 (56, N = 155) = 103.07, p < 0.001.

In terms of demographics, Medicare enrollment and race/ethnicity had statistically significant associations with perceived risk, χ^2 (42, N = 155) = 128.51, p < 0.001 and χ^2 (140, N = 155) = 182.950, p = 0.009, respectively. Additionally, a statistically significant relationship was found between STI knowledge and perceived risk, (χ^2 (70, N = 155) = 93.24, p = 0.03). No statistically significant relationships were found between sexual activity and perceived risk.

Multiple linear regression was calculated to predict perceived risk from risk behaviors, demographics, and STI knowledge based on the chi-square and correlation results presented above. These variables statistically significantly predicted perceived risk, F (6, 94) = 2.84, p = 0.014, R^2 = 0.100. This model explains about 10% of the variance, with the STI knowledge score predicting increased perceived risk (p = 0.001). Table 4 provides all the variables within the model and their relative significance.

Table 5: Multiple-Linear Regression Model Examining the Predictors of Perceived Risk of Contracting an STI in Persons 65 and Older in Clark County, Nevada

Variables	t-statistic	Significance	Standard Coefficient B	95.0% Confidence Interval for B	
				Lower Bound	Upper Bound
Length of One Main Sex Partner	-0.608	0.545	-0.061	-1.102	0.585
Condom Usage	0.638	0.525	0.065	-0.431	0.839
Age	-0.457	0.649	-0.045	-0.096	0.060
Medicare Status	0.359	0.720	0.036	-1.560	2.249

Race/Ethnicity	-1.825	0.071	-0.180	-0.704	0.030
STI Knowledge Score	3.530	0.001	0.338	0.350	1.249

Research Question 3: What are the predictors of talking to providers about STI prevention in persons 65 and older in Clark County, Nevada?
When asked how comfortable participants were with talking with their physician about their sexual health, 32.6% said they were never comfortable discussing these issues with their physicians. However, 29.1% of the participants said they felt comfortable all the time discussing their sexual health with their physician. Additionally, when asked how often they talk about sexual health with their physician, 61.3% said they never discussed their sexual health with their physician. Whereas only 6.8% of participants said they discuss their sexual health every time with their physician. Finally, more men (31.0%) indicated they were more comfortable talking with their physician every time compared to women (22.7%), but a significant proportion of both men (54.0%) and women (62.1%) indicated they never talk with their physician about their sexual health. See Table 5 for the results of talking with their physician about sexual health

Chi square analysis was used to examine the association between the dependent variables STI knowledge, sexual activity, and demographics with the independent variable, comfort of talking with a physician about sexual health. Two statistically significant relationships were present. The first relationship was between current sexual activity status and comfort of talking about sexual health with a physician, χ^2 (18, N = 155) = 170.24, p < 0.001. The second relationship was between previous diagnosis of an STI and comfort of talking with a physician about sexual health, χ^2 (15, N = 155) = 158.75, p < 0.001. Additionally, several demographic

variables demonstrated statistically significant relationships with comfort of talking with a physician about sexual health, including gender (χ^2 (18, N = 155) = 165.16, p < 0.001), Medicare status (χ^2 (24, N = 155) = 172.81, p < 0.001), race/ethnicity (χ^2 (66, N = 155) = 213.115, p < 0.001), education level (χ^2 (72, N = 155) = 219.55, p < 0.001), and marital status (χ^2 (54, N = 155) = 192.65, p < 0.001).

Chi square analysis was used to examine the association between the dependent variables STI knowledge, sexual activity, and demographics, and the independent variable of frequency of talking with a physician about sexual health. The same significant variables in the previous paragraph were also statistically significant; current sexual activity status and previous diagnosis of an STI, χ^2 (15, N = 155) = 171.43, p < 0.001 and χ^2 (15, N = 155) = 169.81, p < 0.001, respectively. Additionally, many demographics demonstrated statistically significant relationships with frequency of talking with a physician about sexual health, including gender (χ^2 (15, N = 155) = 164.72, p < 0.001), Medicare status (χ^2 (20, N = 155) = 166.42, p < 0.001), race/ethnicity (χ^2 (55, N = 155) =189.48, p < 0.001), education level (χ^2 (60, N = 155) = 191.46, p < 0.001), and marital status (χ^2 (45, N = 155) = 191.08, p < 0.001).

Multiple linear regression was calculated and significantly predicted the comfort of talking with a physician about sexual health, F (7, 124) = 2.39, p = 0.025, R^2 = 0.069. This model explains about 7% of the variance. Medicare status was statistically significantly associated with level of comfort in talking with a physician (p = 0.042). Full model results are found in table 6.

Table 6: Multiple-Linear Regression Model for Comfort of Talking with Physician About Sexual Health

Variables	t-statistic	Significance	Standardized Coefficients B	95.0% Confidence Interval for B	
				Lower Bound	Upper Bound
Current Sexual Activity Status	1.808	0.073	0.156	-0.016	0.355

STI Diagnosis History	0.586	0.559	0.051	-0.178	0.328
Gender	-1.628	0.106	-0.139	-0.311	0.030
Medicare Status	2.053	0.042	0.175	0.012	0.677
Race/Ethnicity	-1.781	0.077	-0.153	-0.123	0.006
Education Status	0.559	0.577	0.051	-0.039	0.071
Marital Status	0.108	0.223	0.108	-0.030	0.129

The multiple linear regression model predicted the frequency of talking with a physician about sexual health was significant, $F_{(7, 127)} = 2.79$, $p = 0.010$, $R^2 = 0.086$. This model explains about 8% of the variance, with the current sexual activity status ($p = 0.005$) and gender ($p = 0.013$) predicting frequency of talking with a physician. Full model results are found in table 7.

Table 7: Multiple-Linear Regression Model for Frequency of Talking with Physician about Sexual Health

Variables	t-statistic	Significance	Standardized Coefficient B	95.0% Confidence Interval for B	
				Lower Bound	Upper Bound
Current Sexual Activity Status	2.866	0.005	0.242	0.077	0.422
STI Diagnosis History	1.369	0.173	0.116	-0.071	0.391
Gender	-2.523	0.013	-0.210	-0.358	-0.043
Medicare Status	0.528	0.598	0.044	-0.228	0.393
Race/Ethnicity	0.361	0.719	0.031	-0.048	0.070
Education Status	0.322	0.748	0.029	-0.043	0.059
Marital Status	-0.392	0.695	-0.034	-0.089	0.060

Discussion

The purpose of this study was to use the Sexual Health Model to examine predictors of perceived risk of STIs, STI knowledge, sexual activity, comfort talking to and frequency of which sex was discussed with a physician in persons 65 years of age and older residing in Southern Nevada. We found that over one quarter of participants were sexually active, yet few had been tested for STIs. Many knew that condoms were an effective form of prevention, but few knew that older adults make up the largest increase in STI in-office treatments or that Medicare covers STI screenings. Additionally, nearly one third of respondents said that they did not feel comfortable talking with their physician about their sexual health and over 60% said they never discussed it with their provider. We identified some determinants of sexual knowledge, behaviors and health that can

inform prevention efforts and interventions targeted at older adults.

In terms of overall STI knowledge, participants had, on average, a higher score than was originally expected. Prior research has found that many persons who are 65 and older lack awareness of condom usage for reasons other than pregnancy prevention and have lower levels of knowledge about sexually transmitted infections and how they are contracted (Boskey 2019; Letvak and Schoder, 1996). Our findings are positive and are likely indicative of either an increase in knowledge among older adults or that the study population, for whatever reasons, are more knowledgeable.

Very few studies have examined differences in STI knowledge between men and women, aged 65 and older. One study found that women were more knowledgeable in terms of sexuality compared to men (Okuno, Fram, Batista, Barbosa, & Belasco, 2012). However, this study found that both men and women had a relatively similar knowledge score. Men's mean STI knowledge score was 2.6, with women's average STI knowledge score being 2.5. With only 0.1 difference between the two genders, no conclusions can be made as to if one gender if more knowledgeable than the other.

The second research question aimed to identify any predictors of perceived risk of contracting an STI in persons 65 and older in Clark County, Nevada. Our findings indicate that participants had, on average, a relatively high perceived risk. In general, participants did not think of themselves as being at risk but realized that someone else their age could be at risk if they engaged in risky behaviors. Similar results were observed in another study which examined perceived risk of contracting HIV/AIDS (Pichon, 2000). Both the previous and current studies found that persons 65 and older do not think of themselves as being of high risk for contracting an STI, however, they do perceive other individuals their age at being of higher risk of contracting an STI. As such, an opportunity for intervention exists in order to have persons 65 years of age and older to perceive themselves personally as being at high risk if engaging in risky behaviors.

STI knowledge was the strongest predictor of perceived risk of contracting an STI, with more knowledge being associated with increased perceived risk. This is consistent with general behavioral theories which posit that knowledge increases risk perception. As previously states, this is a positive finding from a public health standpoint since perceived risk is often a necessary step in behavior change.

The third and final research question aimed to identify the predictors of talking to providers about STI prevention in persons 65 and older in Clark County, Nevada. Our findings indicate few participants were comfortable talking with their provider, and even fewer actually did talk with their provider about their sexual health. Previous studies have indicated an inverse relationship between acknowledging sexual history and the age of the patient (Ports, Barnack-Tavlaris, Syme, Perera, & Lafata 2014). Many other studies have found similar results, in which physicians, or other healthcare professionals, do not discuss sexual health with patients who are older (Xu, Schillinger, Aubin, St. Louis, & Markowitz, 2001). Regression results indicated that Medicare enrollment was the strongest predictor of how comfortable participants were discussing their sexual health with a physician. Participants with Medicare are more likely to visit their physicians regularly compared to those without Medicare, which may play a role in level of comfort discussing their sexual health. Furthermore, those who were sexually active, and males talked about their sexual health with their provider more frequently. This result is similar to findings from Lindau and colleagues (2007) who reported that men were more likely to report having discussed sex with their doctor. Further, males tend to frequent a physician's office more due to physiological factors that impact sex, such as erectile dysfunction, which may make it easier for males to have a dialog with their provider (Purposa, 2012). The overall lack of comfort and discussion about sexuality is concerning given percent condom use and that 27% of participants were sexually active.

Limitations and Threats to Validity
As with all studies, this study had some limitations. This study used a cross-sectional design; therefore, the independent and dependent variables were not always consistent. Due to the pandemic, data collection had to be done differently from what was originally planned. Given the shutdown of essential services and overall disease risk, not a lot of people, especially older adults, were going to their usual doctor's appointments, which resulted in a small sample size. Additionally, sampling occurred in a physician's office, and specifically a cardiology practice. Sampling at a healthcare practice is likely to have resulted the large proportion of Medicare

insured patients. Further, because erectile dysfunction and cardiovascular issues are correlated, sampling at a cardiologist's office may have led to an increase in males who were comfortable or who had recently spoken with their provider about sex and may have also led to an increased awareness of sexual health when compared to older adults not seeking cardiologic care. The sample was highly educated, with a majority of participants completing some sort of college. These results may not reflect the overall educational levels of persons 65 years of age and older in Clark County, Nevada. Furthermore, the sample obtained for this study does not reflect the diversity of Clark County, Nevada. For example, a limited number of Hispanics completed the study, which may be due to cultural reasons; therefore, the results may be different if more Hispanics completed the study.

By doing data collection at a physician's office a potential threat to external validity was social desirability. Although the physician had no participation within the study, participants may have responded to the questions in a way that they believed the physician or researcher wanted them to. Attempts to minimize social desirability were made by clearly stating within the consent form that the residing physician had no involvement in the study or the survey that participants were asked to complete. However, bias may still be present. Finally, even though validated tools were used, some of the questions had verbiage which may have been difficult for some participants to understand and may have created uncertainty in how to respond to certain questions. For example, one question asked, "In the past year, have you only had one main sex partner?" Some participants struggled to answer this because their partner had been deceased, but he/she was their main sex partner throughout their life. Therefore, some clarification was requested by some participants. Another question's answer choices did not coincide with the question being asked. This question asked participants "Since turning 65, how comfortable are you talking with your physician about your sexual health?" but the answer choices were "Everytime", "Sometimes", "Never", and "Not Sure." Some participants asked for clarification in terms of how to answer that question. These issues with the wording may have affected the way some participants responded.

Conclusion
This study is one of the few examining sexual health within the 65 and older population. This study

assessed this population's sexual health knowledge, their perceived risk of contracting an STI, and their risk behaviors. The findings of this study indicate a few predictors that impact sexual health of those 65 years of age and older. Although no strong predictors were identified for STI knowledge, this study does show that persons 65 years of age and older still need to improve their knowledge in terms of sexual health within their population. It is, therefore, important to demonstrate proper safe sex practices to this population.

Additionally, participants' STI knowledge was a predictor of their perceived risk of contracting a sexually transmitted infection. However, their perceived risk of contracting an STI was very different than their perceived risk of someone else their age contracting an STI. Helping this population realize they are at risk of contracting an STI is important, especially if they are engaging in risky sexual behaviors.

Finally, this study showed the lack of comfort and frequency of sexual health discussions between persons 65 years of age and older and their physicians or other health care professionals. This study demonstrated that participants are not discussing their sexual health with their physician, which is a potential risk factor for contracting an STI (Ports, Barnack-Tavlaris, Syme, Perera, & Lafata 2014; Crawford, 2017). Overall, persons 65 years of age and older are somewhat aware of STIs in general but are not aware of them within their age group. Efforts should then be made to assist these individuals to learn about the importance of safe sex practices.
Future research should further assess sexual health within the 65 and older population. Persons who completed the survey were in a physician's office, so they were a part of a unique population that may have been more aware of their overall health status. Completing future studies within different areas of Clark County, Nevada, as well as with a more racially diverse group would allow for an examination of the difference in their STI knowledge, perceived risk, or risk behaviors that were not represented by this study's sample.

Additionally, future research should study the health care professional's ageist attitudes and how they share safe sex practices with their older patients. Further study is needed to determine if that is the choice of the patient or if the physician does not give the patient the option based on the assumption that

the patient is not engaging in sexual activities anymore due to their age. To combat ageist attitudes towards the sexual health of persons 65 years of age

and older, students in professional health schools may need more specific training related to sexual health and safe sex measures of this population.

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