NON-CONSENSUAL SEX AND RISK OF DEPRESSION IN FEMALE UNDERGRADUATES AT UNIVERSITIES IN MARITIME CANADA

by

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TABLE OF CONTENTS

LIST OF TABLES

ABSTRACT

Sexual victimization, defined as any incident of unwanted sexual activity,[1] occurs frequently on university campuses.[2] Depression is also common among undergraduate students[3,4] especially among females.[5] Sexual victimization and depression are both associated with negative health outcomes and efforts are made to minimize these as much as possible on university campuses.[6-8] Past studies attempting to explore the relationship between sexual victimization and depression in undergraduate students have been limited by their use of broad definitions of sexual victimization,[9-11] and by failing to examine the relationship independent of other important covariates.[12] Furthermore, no studies have examined this relationship in the context of Canadian university undergraduate populations. The current study addresses these limitations to determine the prevalence of being a victim of non-consensual sex and of risk of depression among female undergraduate students attending Maritime Canadian universities, the factors associated with risk of depression and/or being victim of non-consensual sex, and the independent association between non-consensual sex and current risk of depression after controlling for related factors. Cross-sectional data collected online from students at eight Maritime universities was examined. Universities were selected using a census approach and only data from female students under the age of 30 were analyzed. Non-consensual sex while at university was measured using one dichotomous item and current risk of depression was measured using a validated version of the Center for Epidemiologic Studies Depression (CES-D) Scale.[13] Data was also collected on important covariates that have been shown to be related to depression in adolescents[14] as well as to sexual victimization.[15-19] Previously validated measures had appropriate levels of internal consistency and/or test-retest reliability.[20] All analyses were weighted and data were also imputed using the Sequential Regression Multivariate Imputation Method.[21] Analyses involved basic descriptive statistics, a series of unadjusted logistic regressions, and an adjusted logistic regression in order to determine the independent association of non-consensual sex while attending university and current risk of depression. Plausible spurious relationships and multicollinear relationships were examined. Results indicated that 36.7% of female undergraduate students are at risk of depression and 6.8% have been victim of non-consensual sex while attending university. Factors found to be associated with risk of depression and/or non-consensual sex included substance abuse and risky sexual behaviours. After adjusting for covariates and confounders, females that were victimized were 2.11 times more likely to be at risk of depression than females who were not victimized ($p<.0001$). This study has determined the strong association of risk of depression with the experience of non-consensual sex in female undergraduate university students pointing to the need for more mental health support for victims and more efforts to prevent sexual violence. Also identified are modifiable factors related to being a victim of non-consensual sex as well as for risk of depression. These findings can be used to help inform university mental health services and health promotion activities.

LIST OF ABBREVIATIONS USED

GPA	Grade point average
SMU	Saint Mary's University
MSVU	Mount Saint Vincent University
StFX	Saint Francis Xavier University
UNB	University of New Brunswick
UPEI	University of Prince Edward Island
CBU	Cape Breton University
CES-D	Centre for Epidemiologic Studies Depression Scale
CES-D12	Centre for Epidemiologic Studies Depression Scale 12 Item
SSS	Sense of Social Support Scale
BHSS	Barriers to Help-Seeking Scale
SRMI	Sequential Regression Multivariate Imputation
MIAnalyze	Multiple Imputation Analyze

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CHAPTER 1 INTRODUCTION

1.1 THE UNDERGRADUATE EXPERIENCE IN THE US AND CANADA

In 2003, approximately 35.6% of Canadian high school graduates attended university to study for an undergraduate degree;[1] undergraduate enrolment since then has steadily increased, rising 3% in 2010 from 992,300 to 1,015,000 students in 2011.[23] For many young adults, the beginning of university is a period of transition. It is when most students are living away from their parents for the first time, meeting new peers, while concurrently experiencing increasing academic and non-academic responsibilities and demands. Often, this stressful time is associated with high risk behaviours such as binge drinking,[24,25] and risky sexual behaviours,[26] as well as various mental health issues such as symptoms of anxiety and depression.[2]

1.1.1 Sexual Activity in University Students

Exploring one's sexuality is normal among young people. In Canada, first sexual intercourse usually occurs between age 16- and 18-years.[27] In 2003, approximately 60% of Canadians between the ages of 15 and 24 had already had sexual intercourse at least once, and most remained sexually active after their first experience.[28] This suggests that many undergraduate students start university already having had sexual intercourse. Sexual practices of undergraduate students include oral sex,[29,30] vaginal intercourse,[29] and anal sex.[31] Among undergraduate students, having more than one sexual partner is common.[32] Also, sexual victimization, ranging from unwanted sexual touching or kissing to unwanted sexual intercourse, has been found to occur among undergraduate students, especially among females.[2]

1.1.2 Mental Health Symptoms in University Students

Issues surrounding stress and mental health are especially common among undergraduate students, and most psychological disorders first begin in young adulthood.[33] Surveys of undergraduate populations have found psychological issues ranging from symptoms of clinical anxiety and depression[3] to more serious but less common issues such as suicidal behaviours[3,34] and homicidal ideation.[34] One longitudinal examination of college students' mental health issues found that over a third of students surveyed had symptoms of at least one mental health problem such as depression and 60% of these students had symptoms of at least one mental health problem at two years

follow-up,[35] indicating the prevalence and persistence of symptoms of mental health issues among students. Other research has demonstrated that these mental health issues are on the rise in terms of prevalence and severity in students.[36]

1.1.3 Health Services at Universities

Very little is known about whether health services provided at universities meet the needs of students. However, research in the U.S. has shown that the needs of students with symptoms of mental health concerns such as depression are often unmet. A recent survey of college students found that between 37-84% of students with symptoms of depression and/or anxiety, were not receiving any services due to such reasons as being unaware of services offered by the college and skepticism about treatment effectiveness.[37] This highlights the importance of colleges' and universities' ensuring access to mental health services for undergraduate students. Informed decisions about mental health services can be facilitated by examining unmet mental health needs among students. Universities are in a unique position to take positive steps to deal with depressed mood in students.

1.2 SEXUAL VICTIMIZATION IN THE US AND CANADA

Sexual victimization is broadly defined by Statistics Canada as experiencing any incident of unwanted sexual activity, including sexual attacks and sexual touching.[1] In the U.S.[38] and in Canada,[1] sexual victimization has been found to occur frequently. Data from the Statistics Canada General Social Survey shows that in 2004, there were approximately 512,000 reported incidents of sexual victimization among individuals age 15 and over.[1] This represents a rate of 1,977 sexual victimization incidents per 100,000 among Canadians age 15 and over.[1] Sexual attacks were measured with the item: "During the past 12 months, has anyone forced you or attempted to force you into any unwanted sexual activity, by threatening you, holding you down or hurting you in some way?" and unwanted sexual touching was measured by the question: "During the past 12 months, has anyone ever touched you against your will in any sexual way? By this I mean anything from unwanted touching or grabbing, to kissing or fondling." Data on all incidents reported by police services across Canada demonstrate that many sexual assaults are not reported to the police.[39] The percentage of assault cases involving police has been found to be decreasing over time.[40] Du Mont and colleagues[41] found that among their sample of

300 sexually assaulted women who presented at a Canadian hospital based sexual assault care centre, those who were more likely to report the event to the police were women who experienced a more violent type of assault, such as one with the use of a weapon, the use of physical force, or that resulted in physical injuries. Other research has found that women who are victimized by someone they know are less likely to report to police.[40]This reluctance to report sexual assault to authorities suggests that the self-reported data of the General Social Survey produced more reliable estimates of the true population rate of sexual victimization.

Examining the data from the 2004 General Social Survey,[1] females were found to be significantly more likely to be sexually victimized than males. The rates of sexual victimization were also significantly higher among 15- to 24-year-olds than among individuals aged 55 and over.[1] The highest rate of self-reported sexual victimization was found in individuals who were attending school (See Appendix A). A 2009 report released by the Toronto Police Services found that young women in Canada are especially at risk of sexual victimization with approximately 66% of all female victims being under the age of 24.[42]

1.2.1 Sexual Victimization at University

The issue of sexual victimization among university students was being examined as early as the 1950s in the U.S., with one study finding 56% of their sample of college women reporting coerced sexual activity and 21% reporting coerced attempts at sexual intercourse.[9] This definition of coerced attempts included attempts at (but not necessarily completed) sexual intercourse with the use of violence or threats of violence. Another study examined the issue among 32 colleges in the U.S.[10] With a sample of 3187 female and 2972 male students, researchers found that of the females surveyed, 54% reported events such as unwanted sexual contact and attempted rape in the past academic year and 6% reported actual rape. In order to gain a more representative sample, a more recent U.S. study performed a stratified random sample of 4446 college women and concluded that the projected risk of rape among women attending college during the course of their college career is 1 in 4.[43]

Very few studies have been conducted to examine the issue of sexual victimization among university students in Canada. Twenty years ago, one Canadian

study examined various types of abuse, including sexual abuse, related to dating interactions in university and college students.[11] The authors used a multi-stage, systematic sampling strategy to ensure their results were generalizable to all Canadian university and community college students. They collected data from a sample of 3,142 students (1,835 females and 1,307 males) from 44 institutions in six strata: Atlantic Canada (including Newfoundland), Quebec, Ontario, the Prairies, British Columbia, and a Language Crossover stratum of English speaking schools in Quebec and French speaking schools outside of Quebec. Using items from the U.S. Sexual Experiences Survey created by Koss and colleagues,[10] the authors broadly defined sexual victimization as any unwanted sexual contact, sexual coercion, attempted rape, and rape. Results indicated that 45.1% of female students reported being sexually victimized since leaving high school.

There are several important considerations with the studies mentioned above, especially when interpreting the high rates of sexual victimization at universities. Most notable, is the limitation of a small sample size;[9] also of note is the use of broad definitions of sexual victimization (e.g., including sexual touching to completed rape).[9-11] These limitations need to be considered when interpreting the rate of non-consensual sex in the present study.

1.2.2 Predisposing Individual Risk and Protective Factors

Risk factors have been identified in relation to various types of sexual victimization, including non-consensual sex. In female youth, being from a lower income family, being from a socially isolated background, family architecture such as being from a family with a stepfather, living without the biological mother, and having a mother with lower education have been associated with increased risk of childhood sexual victimization.[15] Among adolescents, risk factors for being sexually victimized include risk taking behaviours such as binge drinking, having a history of sexual abuse, and having authoritative parents.[16] Peer influences have also been identified as a risk factor for sexual victimization among adolescents.[16-18] Adolescents who conform more to peer influences[16] and who are part of a sexually active peer group[17,18] are at increased risk of being sexually victimized. Among adolescent females, various health risk behaviours have been found to be associated with sexual victimization.[19] These include unsafe sexual behaviours, such as having sex without using birth control, using marijuana, and having

been in a physical fight with a peer. The age of first alcoholic beverage consumption has also been found to be associated with sexual victimization.[19]

1.2.3 Outcomes Associated with Sexual Victimization

Sexual victimization in women can result in serious short-term and long-term negative health outcomes.[6] Women age 15 and over who were sexually victimized in Canada have reported initial feelings similar to victims of other forms of violent crime, such as anger, confusion and frustration, shock and disbelief, annoyance, and fear.[1] In terms of long-term health issues, various types of sexual victimization have been linked to post-traumatic-stress disorder,[44] depression,[45] suicide ideation and suicide attempts.[46,47] In a national sample of U.S. women, those who had been sexually victimized as adults had a higher prevalence of suicidal ideation and attempts than non-victims.[46] One study found that women with a history of sexual victimization were six times more likely to have attempted suicide.[47] Sexual victimization has also been linked to completed suicide.[48] A recent study in adult Danish women found that being sexually victimized at any age results in a 14 fold increase in risk of actually committing suicide in adulthood.[48]

The negative consequences associated with sexual victimization can have an impact not only on the victim, but can also place a large financial burden on society. In Canada, annual estimates have included all violence against women, not just sexual victimization. These estimates are enormous at approximately 1.5 billion dollars in terms of health and well-being[49] and 4.2 billion dollars annually for social services, education, criminal justice, labour/employment, and medical/health services.[50]

1.2.4 Gender Specific Responses to Victimization

Adolescents who experience various types of victimization, including sexual victimization, are at increased odds of negative behavioural outcomes in adulthood, such as illicit drug use and violent offending.[51] In Canada, children who have been physically, sexually, and/or mentally abused are at increased odds of various types of mental health conditions such as eating disorders, depression, and suicidal ideation.[52] Research has shown that men and women experience different types of victimization more frequently.[53] While men are more likely to experience physical victimization (e.g., physical assault), women are more likely to be sexually victimized in childhood and adulthood.[53] Furthermore, studies on differential responses to victimization at various stages in life

between men and women have shown that men who are victimized as children tend to respond to the traumatic event by externalizing, such as acting aggressively and committing crimes.[53] Women, however, tend to internalize emotional distress as a response to childhood victimization, such as displaying more substance dependence and depression in adulthood.[53] These findings indicate that women who are sexually victimized in adulthood may be more likely to experience symptoms of depression than men who are victimized. Also, some outcomes associated with victimization actually serve as predictors for further sexual victimization, with alcohol use being known to increase the odds of sexual victimization in women.[54]

1.2.5 Opportunity in Relation to Sexual Victimization

The role of opportunity has been considered to develop a more complex understanding of certain criminal behaviours.[55] Opportunity theory moves beyond individual predisposing factors as predictors, suggesting that certain opportunities that put people at increased risk of committing crimes and being victimized also play a significant role. Various studies have shown people are more likely to be a victim of a crime when they are exposed to high risk situations more often. For example, Asbridge and Butters[56] found that the opportunity of increased driving frequency, as measured by kilometers driven, increases the odds of being a road rage offender or victim. This opportunity framework can also be used to understand sexual offenses and victimization.[55] In the context of childhood sexual victimization, children are more likely to be sexually victimized when placed in situations with an adult who encounters them through daily activities. Examining the present study with an opportunity theory lens allows for the identification of more than just predisposing individual risk factors (such as age or ethnicity) that may put individuals at risk for experiencing non-consensual sex. It allows for the identification of possible risk factors/opportunities (e.g., living situation, employment, social suport) that can be modified to reduce the risk of being victim of non-consensual sex from occurring.

1.3 DEPRESSION IN THE US AND CANADA

Clinical depression is common among Americans[57] and Canadians.[58] In Canada, it is estimated that 7.9% to 8.6% of individuals over 18 years of age will experience clinical depression at some point in their lives.[59] Higher rates of clinical depression are found

among Canadian women than men with women being twice as likely as men to experience depression.[60] In 1999, the proportion of Canadian women who were hospitalized for clinical depression was significantly higher than the proportion of men who were hospitalized at all ages (See Appendix B).[61] This sex difference in hospitalization rates of clinical depression was especially large in young women between 15 and 19 years of age.

1.3.1 Clinical Depression and Risk of Depression at University

In undergraduate populations, a 2005 U.S. web-based survey sampled 2,843 students from a large Midwestern public university and found that 15.6% of students had either depression and/or an anxiety disorder and that the most common psychological condition found among students was clinical depression at 13.8% of their sample.[3] In Canada, one survey at the University of Alberta found that 60% of its sample of 5000 undergraduates reported symptoms of depression such as feeling hopeless.[4] In terms of sex differences, survey data has also shown that female students tend to report higher levels of unacceptable stress while attending university.[62] Mood issues such as symptoms of depression have also been found to be, more prevalent in female students.[5] Many undergraduate students with clinical depression or symptoms of depression go untreated. One American study found that 85% of their sample of students who met diagnostic criteria for depression were not receiving any type of psychiatric treatment.[63]

1.3.2 Risk and Protective Factors for Depression

Various factors are known to be risk factors for clinical depression including gender,[64] family history,[65] and life-stressors.[65] Other factors are also known to be protective against clinical depression, such as social support.[66] In adolescent student populations, school connectedness (defined as the extent to which students feel supported, included and accepted by others at school) has been found to be protective for risk of depression in both males and females.[14] Religious beliefs have also been found to be protective against clinical depression in adolescents.[67] Other risk factors in adolescents and young adults include poor relationships with parents,[68] substance use,[69] lower familial socioeconomic status,[70] as well as having a minority sexual orientation.[71]

1.3.3 Depression and Negative Outcomes

Clinical depression and risk of depression are associated with many personal negative health and behavioural outcomes. In older populations, clinical depression has been found to increase the risk of death in both men and women.[72] Clinical depression has also been found to interact with other medical and neurological conditions, exacerbating the health consequences.[73] Longitudinal studies have shown that clinical depression in early adolescence is related to poorer self-perceived health, poorer interviewer-rated health, higher health care utilization and increased work impairment in young adulthood.[7] In student populations, symptoms of depression have been identified as a significant predictor of negative academic outcomes such as poor grades/lower GPA and school drop-out.[8]

With regard to economic costs, in the U.S., the overall economic burden of clinical depression was estimated to be 83.1 billion dollars in 2000.[74] In Canada, estimates of the economic burden of clinical depression alone are scarce. However, the economic burden of all mental health issues in Canada is conservatively estimated at 50 billion dollars annually.[75] The World Health Organization estimates that by 2020, clinical depression will be the second leading cause of global burden of disease.[76]

1.4 RESEARCH ON SEXUAL VICTIMIZATION AND DEPRESSION

For both men and women in the general population, sexual victimization in the form of childhood sexual abuse is associated with an increased risk of developing adulthood depression.[52,77] Males who were sexually abused as children are more likely to develop substance abuse problems while females are more likely to develop anxiety and clinical depression.[78]

In U.S. college and non-college youth, sexual victimization was found to be associated with poorer psychological well being.[12] However, the authors of this study examined this relationship using a broad definition of sexual victimization, which ranged from experiencing unwanted touching to rape. The definition also included a wide range of sexual victimization experiences such as childhood sexual assault to assault occurring while attending university. There is evidence to suggest that these sexual victimization experiences are qualitatively different in terms of impact on the victim.[79] For example,

Testa and Dermen[79] examined sexual coercion (i.e., sexual intercourse completed by emotional or verbal persuasion) versus rape and attempted rape, defined in their study as completed or attempted sexual intercourse achieved by force, to determine if the two events had different correlates. The authors found that while some variables such as casual sexual activity and alcohol consumption were correlated with both forms of victimization, personality variables (e.g., low self-esteem and low assertiveness) were highly correlated with sexual coercion but not with rape or attempted rape. Furthermore, the perceived impact of alcohol consumption on sexual enhancement, risky sexual behaviour, and disinhibition were correlated with sexual coercion but not with rape or attempted rape. These findings suggest that while there are some similarities between rape/attempted rape and sexual coercion, they are potentially different events.

Another study found that within a general community of Los Angeles, among their sample of 3132 adults, women who reported experiencing sexual victimization that resulted in unwanted sexual intercourse were more likely to report symptoms of depression.[80] However, the authors were only interested in certain demographic and circumstantial factors (e.g., the number and gender of assailant) and their role in the relationship between exposure and outcome. The authors failed to collect information on potential covariates that would need to be controlled for in order to determine the independent relationship between non-consensual sex and risk of depression in their sample.

There has been very little research examining the independent relationship between different types of sexual victimization and risk of depression in female undergraduate populations in various countries, and this is true also of Canada. This lack of information on how much, if at all, various types of sexual victimization contribute to the risk of depression in female undergraduates presents a major gap in the literature. Clinical depression/symptoms of depression and sexual victimization, individually, are both issues university administrators and health services providers should seek to minimize. Having an understanding of the contribution of sexual victimization in the development of risk of depression in women could help consideration of activities to prevent non-consensual sex from occurring on campus, and also aide in the immediate and long-term treatment of victims of non-consensual sex to ensure symptoms of

depression do not go untreated. If the relationship between the specific experiences of sexual victimization and risk of depression in undergraduate university females is strong, this will point to the possible need for more mental health support for victims.

1.5 LIMITATIONS OF PAST RESEARCH

Past research examining the relationship between sexual victimization and risk of depression among college and university females has been limited by:

1. Failing to examine the association between sexual victimization and risk of depression independent of other important confounders (e.g., risky sexual behaviours) that are frequently observed in the undergraduate population and that are associated with depression.
2. Employing broad definitions of sexual victimization which span between unwanted touching to rape.[12] These experiences have been shown to be associated with distinct antecedents and differential health outcomes[80] which suggests that they are qualitatively different events and should be examined separately. Researchers have also tended to collapse experiences of sexual victimization over the course of the life span (e.g., collapsing childhood sexual trauma and sexual assault in university). Again, these experiences are likely qualitatively different and should be studied separately.
3. The lack of data examining the prevalence of and independent relationship between risk of depression and non-consensual sex among undergraduate females in Canada and in other non-U.S. countries. It is possible that risk of depression and non-consensual sex are prevalent and related issues on Maritime (and Canadian) campuses that are currently unrecognized and unaddressed.

1.6 MOVING FORWARD IN RESEARCH ON SEXUAL VICTIMIZATION AND RISK OF DEPRESSION IN FEMALE UNDERGRADUATE STUDENTS

The current research addresses the limitations of past research by:

1. Narrowing the definition of the exposure of interest by examining only females who are victims of non-consensual sex while attending university.

2. Including data collection on potential covariates or confounders in order to control for them in the analyses, allowing an examination of the independent relationship between having non-consensual sex while attending university and current risk of depression in undergraduate females.
3. Examining the prevalence of and relationship between risk of depression and non-consensual sex using data collected from students attending eight Maritime Canadian universities.

The research questions of this study are:

1. What is the prevalence of being a victim of non-consensual sex and the prevalence of having risk of depression among female undergraduates while attending university in Maritime Canada in 2012?
2. What are the factors associated with risk of depression among female undergraduates attending Maritime universities? Identifying factors associated with risk of depression can inform where university mental health services should target their prevention/reduction activities.
3. What factors are associated with being a victim of non-consensual sex among female undergraduate students attending a university in Maritime Canada? Identifying associated variables is critical to informing universities about potential intervention strategies to minimize non-consensual sex from occurring among students.
4. Is having had non-consensual sex while at university independently associated with current risk of depression when other factors (e.g., substance abuse, social support) are controlled for?

CHAPTER 2 METHODS

2.1 RESEARCHER ROLE

This research study will use data from a student survey, which targeted undergraduate students at post-secondary education institutions in Maritime Canada. The researchers for the larger study developed and piloted the survey, and collected the data. A description of these activities is provided below. My primary role as a Master of Science student was developing the rationale for the present study on non-consensual sex and risk of depression in Maritime Canadian undergraduates, and conducting data analysis on a subset of the already collected data from this survey.

2.2 RESEARCH DESIGN AND RATIONALE

Eight universities in Maritime Canada (Dalhousie University, St. Mary's University (SMU), Mount Saint Vincent University (MSVU), Acadia University, St. Francis Xavier University (StFX), University of New Brunswick (UNB), University of Prince Edward Island (UPEI), and Cape Breton University (CBU) were recruited to participate in the study. These schools represented the majority of English speaking universities with broad undergraduate programs in Maritime Canada. All undergraduate students at the eight participating universities had the opportunity to participate. Participants were asked questions about their general demographics, health status, knowledge of sexual health, health behaviours, and use of university health services.

The research design is a cross-sectional survey or a "snapshot" of university undergraduate students during the 2012 academic year. This research design allows for a description of the current prevalence of risk of depression and non-consensual sex and the ability to determine the relationship between these two events. Although the ideal study design to capture this information would be longitudinal, the use of a cross-sectional survey was more feasible.

2.3 STUDY POPULATION AND DATA COLLECTION

The target population for the proposed research included all female undergraduate students under the age of 30 attending eight universities in Maritime Canada in the fall of 2012. The cut point of 30 was chosen because women over 30 are at decreased risk of being sexually victimized.[1] Universities were selected if they were English speaking and offered a broad range of undergraduate programs. A census type approach was used in

which attempts were made to contact all current undergraduate students to ask them to participate by their respective university using university email list servers. Even though all current female undergraduate students were attempted to be contacted by email to participate in the study, not all decided to participate. Researchers collected data in September to November, 2012 using an online survey instrument.

2.4 SURVEY CONTENT, DEVELOPMENT AND ADMINISTRATION

2.4.1 The Survey

The online survey includes 44 multiple-choice items and is a collection of validated instruments as well as new items added in response to feedback offered after pre-testing of the survey. The 44 items fall into 4 broad categories: general demographics, health and knowledge, health behaviours and use of university health services. Items include questions on sex, ethnicity, GPA, overall perception of health, depression, social support, substance use, sexual risk taking behaviours, and barriers to/satisfaction with university health services. The survey took participants 20-25 minutes to complete. Please see Appendix C for a detailed list of all items included in the survey.

2.4.2 Survey Development

The researchers developed the content of the survey under a Nova Scotia Health Research Foundation operating grant in 2009-2010. They included items in the survey based on information collected from focus groups of undergraduate students at two Nova Scotia universities, instruments that had already been validated, research literature, as well as expertise from the research team. In the survey, the researchers included validated tools with appropriate levels of internal consistency and/or test-retest reliability, as well as new items where validated measurements did not exist. In 2010, they pilot tested the survey online with 220 undergraduate students at Dalhousie and Acadia University in order to obtain feedback. This feedback was used to further refine the final content of the survey. The researchers did not ask any directly identifiable information in the survey. Therefore, participation was anonymous.

2.4.3 Survey Administration and Consent to Participate

The study was approved by the Research Ethics Boards at each participating university. Researchers used Dalhousie University's online survey software, Opinio, to collect and temporarily store the data until the survey was closed. Opinio is on

Dalhousie's server, is password protected and meets required ethical expectations of electronic security. The survey was opened online to students at the participating universities in the fall of 2012. The survey was first opened to students at Dalhousie University in September and subsequently at the remaining 7 universities. The survey was administered using a modified Dillman approach, a method designed to improve survey response rates using techniques such as administering a participant friendly questionnaire, reminding participants to complete the survey, and using incentives to encourage participation.[81] The survey was closed at the end of November. Students were informed about the survey by their respective university in various ways including being contacted through university email lists and through postings on university websites. Students were contacted by their respective university on two occasions via email to complete the survey. The email included a brief description of the study and a link to the online survey; a consent form was included at the beginning of the survey. The researchers restricted participants to be able to complete the survey only once by selecting one of Opinio's features that recognizes participants' computer IP addresses. Potential participants were encouraged to participate with the incentive of having their name entered anonymously in a draw to win an iPad.

2.4.4 Survey Response Rate

Overall, the combined response rate for all universities was 20.4%. One meta-analysis on web-based survey response rates found that the mean response rates for surveys with and without missing data was 39.6% and 34.6% respectively.[82] An online survey of undergraduates at Canadian universities resulted in a 44% response rate.[25] A 39% response rate was obtained using another online survey at Dalhousie University.[83] The response rate obtained with this study is lower than initially expected by the researchers. However, researchers from one study on substance use in heterosexual, homosexual, and bisexual college students who obtained a similar response rate to the present put forward the argument that a contributing factor could have been that the survey did not reach all of the targeted population, for reasons such as invitation emails not being read and some students having inactive email accounts.[84] Also, approximately 66% of all respondents in the current study were female. The population of interest is

females under 30, who make up 64.3% of the respondents. The overall response rate for females under the age of 30 was 33.8%.

2.5 VARIABLES OF INTEREST AND MEASUREMENT PROPERTIES

2.5.1 Main Exposure Variable

The main independent variable of interest in this study is non-consensual sex while attending university. This was measured using one dichotomous yes/no item with the following wording: *"Since you have been at university, have you ever been forced to have sex of any type against your will?"*. This was a new item created by the researchers of the study. Although the researchers piloted this item in their pre-test pilot study at Dalhousie and Acadia, they did not perform test-retest on this item and subsequently, there is no Cohen's kappa score available for this item. However, a similar item has been shown to have high validity and adequate test-retest reliability when tested in younger populations. The Juvenile Victimization Questionnaire,[85] includes the following item on attempted or completed rape in the past year: "*In the last year, did anyone TRY to force you to have sex; that is, sexual intercourse of any kind, even if it didn't happen?*" This item had a 100% agreement between two separate administrations with 2,030 students. This item also demonstrated a non-statistical difference between self-report and proxy report, with higher levels of sexual victimization being reported from the respondent themselves, versus a proxy. This adds further support for the use of the self-reported item used to capture the true prevalence of non-consensual sex in this population.

2.5.2 Main Outcome Variable

The main dependent variable of interest is current risk of depression. This was measured using the 12-item version of the Centre for Epidemiologic Studies Depression (CES-D) Scale, validated for use in Maritime adolescents.[13] Participants are asked to answer how frequently certain depression symptoms had occurred in the previous week. The items of the CES-D12 are presented in Appendix D. The CES-D12 scale ranges in score from 0-36. A score of 12 or more indicates moderate to high risk of depression.[14] This measure has an internal consistency in adolescent populations as measured by Cronbach's alpha of 0.86.[20] For the present study population, Chronbach's alpha for the CES-D12 was 0.85.

2.5.3 Main Control Variables

The survey included potential covariates that have been previously found to be related to depression[14] and/or sexual victimization.[15-19]Previously validated measures had appropriate levels of internal consistency and/or test-retest reliability. Covariates that were measured using new items (e.g., living situation) only underwent pilot testing during the pre-test and therefore do not have associated psychometric properties that can be reported. Most pre-test items had been previously tested in adolescents in Nova Scotia and were shown to have acceptable test-retest reliability.[14,20,86] The contribution of these variables in relation to current risk of depression in the study population were measured and those found to be significant covariates were controlled for when determining the independent relationship between non-consensual sex while at university and current risk of depression in female undergraduates.

The following paragraphs describe the key variables that were examined as potential covariates.

Demographics

Age: Both depression and sexual victimization occur at different rates in various age groups. For example, in Canada, sexual victimization is significantly higher among 15- to 24-year-olds than among individuals age 55 and over.[1,61] This variable was manually cleaned to convert all entries to numeric values in years. If a participant entered their year of birth, this was converted to age in years by using the formula *2012-Year of Birth*. Age was kept as a continuous variable for the regression analyses but was categorized into three categories "17-19" "20-24" and "25-29" for the purposes of cross-tabulations.

Ethnicity: Research has demonstrated differences in rates of depression among adolescents of various ethnic groups.[87] For example, ethnic minorities such as Mexican Americans have been found to have a higher prevalence of depression compared to other ethnic groups.[87] The rates of sexual victimization, including rape, have also been found to vary by ethnicity.[10] One study found that among their sample of 6159 higher education studesnts, Native American women reported the highest prevalence of rape followed by white women.[10] The variable measuring ethnicity for this study was dichotomized into "White" and "Not white" with not white being the referent category.

GPA/High School Grades: Better academic performance has been found to be associated with a decreased risk of adolescent depression.[88-90] However, other research has shown that a higher GPA is associated with an increased risk of sexual victimization in females.[91] For the present study, first year students were asked to report their average high school grades from the previous year while second year students and higher were asked to report their average university grades from the previous year. This variable was manually cleaned and all data were converted to the appropriate percentage based on the corresponding university's GPA scale. GPA was categorized into "at or above average grades" and "below average grades" using the mean of the university GPA (76.5) as the cut-point for second to fifth year students and using the mean high school grades (86.2) as the cut-point for first year students. The referent category was below average grades.

Employment Status: Aligning with opportunity theory,[55,56] employment status could be an important variable that puts individuals at varying risk of being victimized. The number of hours per week spent working was manually cleaned to convert any text responses to numeric and was kept as a continuous variable for the purposes of analyses.

Living Arrangements and Housing Location: Also aligning with opportunity theory,[55,56] living arrangement could be an important variable that puts individuals at varying risk of being victimized. In this survey, who the respondent lives with was measured with one item.[20] This variable was categorized into four discrete categories: 1. I live alone (referent category), 2. I live with one or both of my parent(s), 3. I live with my partner (i.e., sexual or romantic partner, spouse, or girlfriend/boyfriend), 4. I live with a roommate(s) (not a sexual or romantic partner). A second variable, whether or not the respondent lives on campus, was measured with one item. This variable was categorized into two discrete categories: 1. I live off-campus (referent category) and 2. I live on campus in student residence/housing.

Importance of Religion: Religiosity, specifically the importance one places on religion, has been shown to be protective of adolescent depression[67] with those who place more importance on religion being at decreased risk of developing depression. Importance of religious beliefs was coded on a scale from 1 to 4 with 1 being "not important at all" and 4 being "very important". This item was further dichotomized into two categories: "Not at

all or not very important" and "Fairly or very important". "Not at all or not very important" was set as the referent category.

Socioeconomic Status (SES): The socioeconomic gradient has been demonstrated among adolescents in relation to depression with lower SES being associated with increased rates of depression.[92] Childhood SES has also been found to be a major predictor of adult depression with lower SES being associated with an increased risk of adulthood depression.[93] In the present study, participants were given a score from 1 to 5 on SES, 1 signifying very wealthy and 5 signifying not wealthy at all. This was further categorized into three groups: 1. Very wealthy/quite wealthy (referent category), 2. Average, and 3. Not so wealthy/not wealthy at all.

Sexual orientation: Being an adolescent of a sexual minority, such as being homosexual or bisexual, is associated with higher rates of depression.[94] For the purposes of analyses, sexual orientation was dichotomized into two discrete categories: "100% heterosexual" and "not 100% heterosexual" with "not 100% heterosexual" being the referent category.

Health, Health Knowledge and Social Well Being

Need for Control and Self Reliance Domain of the Barriers to Help-Seeking Scale: Positive attitudes toward help-seeking as well as having saught help have been found to be related to a decreased risk of depression.[95] The Need for Control and Self-Reliance Domain of the Barriers to Help-Seeking Scale was developed by Mansfield[96] and consists of 10 statements that the participant is asked to indicate how much they agree with using a 5 point scale where 1 indicates "Strongly disagree" and 5 indicates "Strongly agree". For the present study, 8 of the 10 items were used to calculate a total score. If one or more of the items was unable to be imputed due to a large amount of missing information for a participant, a total score was not calculated. A higher score on this measure indicates more barriers to help-seeking.[96] This variable was left as continuous for the purposes of analysis.

Social Support: Social support has been found to be protective in the development of depression in adolescents, with those with increased social support being at decreased risk of depression.[66] Also, in accordance with opportunity theory, social support is potentially an important predictor of the risk of becoming victimized. Social support was measured using the Sense of Support Scale[97] which has been validated in undergraduate populations.

The scale includes 21 items scored from 0-4, resulting in a possible total score ranging from 0-84 with a higher score indicating more social support. If one or more scores per participant was missing on this scale, then the total score was not calculated. This variable was left as continuous for the purposes of analysis.

Health Behaviours

The following health behaviour variables were examined as potential covariates. *Risk Behaviours*: Research has shown that adolescents who participate in risk behaviours such as drinking alcohol,[69, 98] and marijuana use[88, 98] are at increased odds of depression.[98] Alcohol use frequency in students has also been associated with increased risk of sexual victimization.[99]

A. *Marijuana Use:* Marijuana use was measured by one item, which asked about a range of marijuana use in the past 30 days. For the statistical analyses, heavy marijuana use was defined as using marijuana ≥ 3 times in the past 30 days. Not being a heavy marijuana user was set as the referent category.
B. *Alcohol Use/Binge Drinking*: Binge drinking was measured by one item, which asked about a range of numbers of use of alcohol in the past 30 days. Heavy alcohol use was defined as having had ≥ 5 drinks in a row on ≥ 3 days in the past 30 days. Not being a heavy alcohol user was set as the referent category.

Sexual Activity and Sexual Risk Taking: Participating in both sexual activity[98] and risky sexual activity[100] have been associated with an increased odds of depression. The following variables were examined as potential covariates in the present study:

A. *Ever Had Heterosexual Vaginal Intercourse*: See Question 21, Appendix E. Never having vaginal intercourse was set as the referent category.
B. *Use of Condom During last Vaginal Intercourse*: This was measured using an item created by Langille.[20] See Question 23, Appendix E. Not having used a condom was the referent category.
C. *Number of people participant has had vaginal intercourse with in the past 12 months*: This was measured using one item (See Question 24, Appendix E).[20] This variable was divided into three categories: 1. One or fewer partners in the past 12 months (referent category), 2. Two partners in the past 12 months, 3. Three or more partners in the past 12 month.

CHAPTER 3 STATISTICAL ANALYSES

All data was analyzed using the statistical software SAS Version 9.3. This program allows for weighted analysis as well as clustered analysis, a technique that assumes errors are correlated in some way instead of assuming that errors are identically and independently distributed. Population weights were created for the data using respondent age, sex, and university. All analyses were weighted to ensure more accurate and representative estimates of the true population parameters. All results from the inferential statistical analysis were corrected for intraclass correlations or clustering among universities using the cluster statement in SAS.

To address the first research question, the prevalence of non-consensual sex among female undergraduates was determined using descriptive statistics, reporting the frequency as well as the proportion of females in the study population who indicated they have experienced non-consensual sex while attending university. The prevalence of current risk of depression among female undergraduates was also determined by using descriptive statistics, reporting the frequency and proportion of females in the study population who were at current risk of depression. The prevalence as dictated by important characteristics such as race and GPA were also reported.

To address the second and third research questions, that of examining which factors are related to the exposure of interest, being victim of non-consensual sex, and which factors are related to the outcome of interest, risk of depression, a series of unadjusted logistic regressions was carried out. Variables were determined as significant using an alpha of 0.05 as a cut-off. Variables were included in the multiple logistic regression model as a covariate or a confounder if they were found to be associated with the the outcome alone or both the exposure and outcome.

The final research question, the independent association of non-consensual sex while attending university with current risk of depression, was examined by conducting an adjusted logistic regression controlling for all significant confounders and covariates. Variables that were found to be at least moderately strongly associated (using alpha of 0.05 as a cut-off) with both risk of depression and non-consensual sex were included in the models as potential confounders. Variables that were found to be significantly associated with risk of depression in the unadjusted analysis were included in the models

as covariates. All factors central to the theoretical understanding of the relationship between non-consensual sex and depression (e.g., socioeconomic status, religiosity) were included in the overall model regardless of level of significance.[67,92] Substance use and risk of depression, in the context of non-consensual sex, were examined with the possibility of a spurious relationship being present (i.e., the possibility that both are outcomes of non-consensual sex) and neither substance use nor risk of depression was included in the model together when non-consensual sex was the exposure of interest. The issue of multicollinearity can reduce the ability to determine an accurate estimate of the independent association between non-consensual sex and risk of depression. Collinearity was assessed by producing a correlation matrix of all independent variables in order to determine if linear relationships exist among two or more of the independent variables. A cut-off of 0.7 was used, with greater than 0.7 indicating a high correlation.

CHAPTER 4 STUDY POPULATION SIZE CALCULATIONS

All universities were analyzed together. Approximately two thirds of the 10361 respondents were female resulting in a final study population size of 6939 women under the age of 30. A preliminary examination of the data revealed that approximately 5% of females experience the exposure of interest (i.e., answered "yes" to experiencing forced sex while at university). This represents approximately 345 cases of the exposure of interest. The ratio of unexposed (i.e. not victim of non-consensual sex) versus exposed (i.e. victim of non-consensual sex) is 19:1. The prevalence of disease outcome (risk of depression) in the unexposed was expected to be approximately 30%, based on the rate of risk of depression seen using the CES-D in high school student populations[14] and the limited research on certain groups of college students.[101] Assuming the percentage of disease outcome in the exposed group will be at least 37.5%, there will be an adequate study population size to detect a minimum odds ratio of 1.40 at a 95% confidence level and 80% power. The following table (Table 1) outlines four study population size calculation examples using various estimates of the percentage of disease outcome in the exposed group.

Table 1: Study Population Size Calculation Examples

Two-Sided Confidence Level	Power	Ratio (Unexposed:Exposed)	% Outcome in Unexposed Group	% Outcome in Exposed Group	Odds Ratio	Minimum Total Study Population Size Required
95%	80%	19:1	30%	37.00%	1.37	7646
95%	80%	19:1	30%	37.25%	1.39	6977
95%	80%	19:1	30%	37.50%	1.40	6679
95%	80%	19:1	30%	37.75%	1.41	6402

CHAPTER 5 DATA IMPUTATION

Some variables in the data set had varying levels of missing data. Fortunately, the levels of missing data in the dataset were low. Missing data can pose problems when conducting regression analysis since cases with missing values on any variables in your model are dropped from the analysis. This results in decreased power and a potentially biased study population. Because of the levels of missing data among certain variables in the present data set, data were imputed using a sequential regression procedure where a series of regressions are performed to produce predicted values for those that are missing.[21] This method of imputation, Sequential Regression Multivariate Imputation (SRMI) is optimal as it reduces bias by taking into consideration other variables that an individual has responded to. Various types of regression are used (e.g., linear, logistic, etc.) depending on the nature of the outcome variable being imputed (e.g., continuous, dichotomous). On the present data set, five imputed data sets were produced. The list of variables that were imputed and the percentage of missing data post-imputation can be found in Appendix F. All variables could not be completely imputed as some respondents did not provide enough information for reliable imputation to occur. All analyses were initially stratified by imputation, thus creating five sets of results for each analytic procedure. If any of the five sets of results differed, the Multiple Imputation Analyze (MIAnalyze) procedure in SAS was used in order to collapse the different results of the multiple imputations and produce more accurate statistical inferences. In the present data set, variables that differed across imputation included age, university grades, high school grades, employment hours, employment status, importance of religion, and wealth.

CHAPTER 6 RESULTS

The overall study population size was 10,512 cases. For the purposes of this analysis, the data set was then limited to only females under the age of 30 years old which resulted in a final data set of 6,939 cases. The following weighted results are based on this subset.

6.1 DESCRIPTIVE ANALYSIS

Descriptive statistics were first calculated for all continuous and categorical variables important for the present study. The results can be found in Tables 2 and 3. Descriptives for categorical variables are presented in their recoded form. The first research question asks about the prevalence of risk of depression and the prevalence of non-consensual sex among undergraduate females at Maritime Canadian universities under the age of 30. Overall, 36.7% were found to be at risk of depression and 6.8% reported experiencing non-consensual sex while attending university.

Cross-tabulations of the prevalence of the exposure of interest and the outcome of interest by important characteristics, such as university, ethnicity, university GPA, age, and year of study were explored next. These results can be found in Tables 4 and 5. Prevalence rates of non-consensual sex varied significantly by risk of depression, age, year of study, living arrangements, housing location, wealth, sexual orientation, marijuana use, alcohol use, ever having vaginal intercourse, use of condom during last time having vaginal intercourse, and number of sexual partners. Prevalence rates of risk of depression differed significantly across non-consensual sex, ethnicity, grades, age, year of study, wealth, sexual orientation, marijuana use, use of condom during last time having vaginal intercourse, and number of sexual partners.

6.2 VARIABLES ASSOCIATED WITH NON-CONSENSUAL SEX

A series of unadjusted logistic regressions was carried out to determine which factors were associated with the exposure of interest, non-consensual sex. The results can be found in Table 6. Year of study was not included in Table 6 because the question regarding non-consensual sex measures victimization during the time at university. Those in their fourth year would have more time to be victimized which would result in a misleading association. The following variables had a significant positive association with non-consensual sex: age, BHSS score, marijuana use, alcohol use, ever having

vaginal intercourse, and number of sexual partners. For each year increase in age there was a 13% increase in the odds of being a victim of non-consensual sex. There was also a 4% increase in the odds of being a victim of non-consensual sex with every unit increase in BHSS score. Women who are heavy marijuana users and those who are heavy alcohol users compare to non-heavy users were 77% and 51% more likely to be victimized respectively. Women who have had vaginal intercourse and those with higher numbers of sexual partners were found to be 247% and 192% more likely to be victim of non-consensual sex respectively.

Variables that had a significant negative association with non-consensual sex were SSS score, living with one or both parents versus living alone, housing location, being of average wealth versus very wealthy or quite wealthy, and sexual orientation. There was a 1% decrease in the odds of being victimized for every unit increase in SSS score. Female students living with one or both parents as compared to living alone and those who live on-campus versus off-campus were 33% and 31% less likely to be victim of non-consensual respectively. Women who identify as being of average wealth as compared to very wealthy or quite wealthy were 36% less likely to be victimized. Also, those who are heterosexual were 54% less likely to be victimized as compared to those who are of a minority sexual orientation.

The following variables had no significant association with non-consensual sex: weekly hours worked, grades, ethnicity, living arrangements at the remaining two levels, importance of religion, wealth at the remaining level and use of a condom during last time of vaginal intercourse.

6.3 VARIABLES ASSOCIATED WITH RISK OF DEPRESSION

Next, a series of unadjusted logistic regressions was carried out to determine which factors were associated with the outcome of interest, risk of depression. Table 7 contains the results of the unadjusted logistic regressions. Non-consensual sex was found to be significantly associated with risk of depression. The odds ratio obtained in the unadjusted logistic regression was 2.32 (95% CI: 1.76, 3.06) signifying that undergraduate females with the experience of non-consensual sex while attending university are 2.32 times more likely to be at risk of depression compared to

undergraduate females who have not experienced non-consensual sex while attending university.

The following variables had a significant positive association with risk of depression: hours worked weekly, BHSS score, wealth, marijuana use, and number of sexual partners. For every hour worked weekly, there was a 1% increase in the odds of being at risk of depression. There was also a 10% increase in the odds of being at risk of depression for every unit increase in BHSS score. Those who are not so wealthy or not wealthy at all were 1.76 times more likely to be at risk of depression than those who are very wealthy or quite wealthy. Females who are heavy marijuana users were 1.51 times more likely to be at risk of depression compared to those who are not heavy users. Finally, those with three or more sexual partners in the past 12 months were 28% more likely to be at risk of depression than those with one or less partners in the past 12 months.

Variables that had a significant negative association with risk of depression were age, grades, SSS score, ethnicity, living arrangements, sexual orientation, and use of a condom during last time having vaginal intercourse. For each year increase in age there was a 4% decrease in the odds of being at risk of depression. Females with above average grades were 31% less likely to be at risk of depression than those with below average grades. There was an 8% decrease in the odds of being at risk of depression for every unit increase in SSS score. Females living with a partner and females living with a roommates(s) were 21% and 16% less likely to be at risk of depression respectively compared to those who live alone. Women who are heterosexual compared to those who are not 100% heterosexual were 41% less likely to be at risk of depression. Finally, those who used a condom during the last time having vaginal intercourse were 15% less likely to be at risk of depression versus those who did not.

Variables not associated with risk of depression were employment status, housing location, importance of religion, alcohol use, ever having sexual intercourse, living arrangements at the remaining variable category, wealth at the remaining variable category, and number of sexual partners at the remaining variable category.

6.4 THE INDEPENDENT ASSOCIATION BETWEEN NON-CONSENSUAL SEX AND RISK OF DEPRESSION

Examining the weighted frequencies, of victims of non-consensual sex, 55.9% were at risk of depression, compared to 35.3% of women who have not been victims of non-consensual sex. The independent association of non-consensual sex while attending university and current risk of depression was examined by conducting an adjusted logistic regression controlling for all significant confounders and covariates. Variables that were found to be associated with both non-consensual sex and risk of depression during the correlational analysis were included in the model as confounders. These variables were: age, BHSS score, SSS score, living arrangements, wealth, sexual orientation, marijuana use, and number of sexual partners. Variables that were found to be associated with only risk of depression during the bivariate analysis were included in the model as covariates. These were: grades, hours worked weekly, ethnicity, and use of a condom during last sexual intercourse. Although it was found to be non-significant, importance of religion was included in the model as it is considered to be central to the theoretical understanding of the relationship between non-consensual sex and depression.[67] Variables that were omitted due to non-significance at the bivariate level include alcohol use, ever having vaginal intercourse, and housing location. The results of the full model can be found in Table 8. Again, year of study was not included in Table 8 because the question regarding non-consensual sex measures victimization during the time at university.

After controlling for all significant confounders and covariates, non-consensual sex was found to be significantly associated with risk of depression. The odds ratio obtained in the adjusted logistic regression was 2.11 (95% CI: 1.57, 2.84). Thus even after adjusting for confounding variables, undergraduate females who have been victim of non-consensual sex while attending university were twice as likely to be at risk of depression compared to undergraduate females who have not been victimized. With regard to goodness of fit of the model, the c statistic was 0.776 indicating that the model is better than chance at predicting the outcome. A c statistic of 0.776 is considered to be in the range of reasonable to strong in terms of goodness of fit.[102-103] Because the prevalence of non-consensual sex increases as age increases whereas the prevalence of risk of depression decreases as age increases, an interaction term using age and non-

consensual sex was entered into the model. This interaction term was found to be non-significant and was therefore not included in the overall model. Finally, collinearity was assessed by examining the correlation matrix of all independent variables in the model. No variable was found to be highly correlated with non-consensual sex indicating that multi-collinearity was not present.

Table 2: Weighted Descriptive Statistics of Continuous Variables (N=6939)

Variable	Mean	95% Confidence Limits	Missing (%)
Age	20.8	20.7, 20.9	0%
Hours worked weekly	7.8	7.5, 8.0	0%
BHSS Score	14.8	14.7, 15.0	1.5%
SSS Score	59.4	59.1, 59.7	3.8%

Table 3: Weighted Descriptive Statistics of Categorical Variables (N=6939)

Variable	Level	Unweighted Frequency	Weighted Percentage	95% Confidence Limits for Percent	Missing (%)
Non-Consensual Sex	No	6428	93.2%	92.5, 94.0	1.3%
	Yes	422	6.8%	6.0, 7.5	
	Total valid	6850	100.0%	N/A	
Risk of Depression	Not at risk	4411	63.3%	62.0, 64.5	0.3%
	At risk	2511	36.7%	35.5, 38.0	
	Total valid	6922	100.0%		
Grades	Below average grades	1512	23.6%	22.4, 24.7	0%
	Above average grades	5225	76.4%	75.4, 77.6	
	Total Valid	6737	100.0%		
Ethnicity-White or Not white	Not white	689	11.2%	10.3, 12.0	0%
	White	6237	88.8%	88.0, 89.7	
	Total valid	6926	100.0%		
Living Arrangements	Lives alone	1328	17.6%	16.7, 18.5	0.1%
	Lives with one or both parent(s)	1702	25.3%	24.2, 26.4	
	Lives with romantic partner	911	14.8%	13.8, 15.8	
	Lives with a roommate(s) (not a sexual or romantic partner)	2990	42.3%	40.9, 43.5	
	Total valid	6931	100.0%		
Housing Location	Lives off campus	5094	76.3%	75.2, 77.3	0.3%
	Lives on campus in student residence/housing	1822	23.7%	22.7, 24.8	
	Total valid	6916	100.0%		
Importance of Religion Dichotomized	Not at all or not very important	4849	68.7%	67.5, 69.9	0%
	Fairly or very important	2090	31.3%	30.1, 32.5	
	Total valid	6939	100.0%		
Wealth	Very wealthy or Quite wealthy	1570	21.5%	20.7, 22.8	0%
	Average	3910	58.5%	57.1, 59.6	
	Not so wealthy or Not wealthy at all	1257	19.9%	18.9, 20.9	
	Total valid	23614	100.0%		
Sexual Orientation Dichotomized	Not 100% heterosexual	2405	34.5%	33.3, 35.7	0.1%
	100% heterosexual	4526	65.5%	64.3, 66.7	
	Total valid	6931	100.0%		
Marijuana Use Dichotomized	Not heavy use (less than 3 times in past 30 days) or none	5980	87.1%	86.2, 87.9	0.6%
	Heavy use (>or=3 times in the past 30 days)	917	12.9%	12.1, 13.8	
	Total valid	6897	100.0%		
Alcohol Use Dichotomized	Not heavy (≥ 5 drinks in a row on <3 days in the past 30 days) or none	4481	66.5%	65.3, 67.7	0.3%
	Heavy use (≥ 5 drinks in a row on ≥ 3 days in the past 30 days)	2436	33.5%	32.3, 34.6	
	Valid total	6917	100.0%		
Ever Had Vaginal Intercourse	No	1429	19.3%	18.3, 20.3	0%
	Yes	5311	77.7%	76.7, 78.8	
	Prefer not to answer	199	3.0%	2.5, 3.4	
	Valid total	6939	100.0%		
Use of Condom During Last Vaginal Intercourse	Not Applicable	1628	22.5%	21.4, 23.5	0.9%
	No	2362	35.3%	34.0, 36.5	
	Yes	2890	42.3%	40.9, 43.5	
	Valid total	6880	100.0%		
Number of Sexual Partners Categorized	Not applicable/Prefer not to answer on whether or not had sex	199	3.0%	2.5, 3.5	0.9%
	One or less partners in the past 12 months	4680	68.1%	66.9, 69.3	

	Two partners in the past 12 months	782	11.5%	10.7, 12.3	
	Three or more partners in the past 12 months	1214	17.4%	16.5, 18.4	
	Valid total	6875	100.0%		

Table 4: Weighted Prevalence Rates and 95% Confidence Limits of Non-Consensual Sex by Participant Characteristics (N=6939)

Variable	Level	Victim of Non-Consensual Sex	Unweighted Frequency	Weighted Percentage	95% Confidence Limits for Percent	Missing (%)	Chi-Square P-value*
Risk of Depression	Not at risk	Not victim	4056	95.3%	94.6, 96.0	1.2%	**<.0001**
		Victim	182	4.7%	3.9, 5.4		
		Total	4238	100.0%			
	At risk	Not victim	2176	89.6%	88.1, 91.2	1.2%	
		Victim	228	10.4%	8.1, 11.9		
		Total	2404	100.0%			
Ethnicity	Not white	Not victim	680	94.1%	92.1, 96.0	2.9%	0.4308
		Victim	38	5.9%	4.0, 7.9		
		Total	718	100.0%			
	White	Not victim	5559	93.1%	92.4, 93.9	1.1%	
		Victim	373	6.9%	6.1, 7.7		
		Total	5932	100.0%			
Grades	Below average grades	Not victim	1272	92.2%	90.6, 94.3	1.6%	0.0952
		Victim	97	7.8%	5.7, 9.4		
		Total	1369	100.0%			
	Above average grades	Not victim	4967	93.6%	92.8, 94.3	1.0%	
		Victim	314	6.4%	5.7, 7.2		
		Total	5281	100.0%			
Age	17-19	Not victim	2570	96.2%	95.4, 96.9	1.2%	**<.0001**
		Victim	99	3.8%	3.1, 4.6		
		Total	2669	100.0%			
	20-24	Not victim	3223	91.7%	90.8, 92.7	1.4%	
		Victim	280	8.3%	7.3, 9.2		
		Total	3503	100.0%			
	25-29	Not victim	446	90.9%	87.0, 94.9	0.8%	
		Victim	32	9.1%	5.1, 13.0		
		Total	478	100.0%			
Year of Study	First	Not victim	1825	97.7%	97.0, 98.4	1.6%	**<.0001**
		Victim	44	2.3%	1.6, 3.0		
		Total	1869	100.0%			
	Second	Not victim	1468	94.2%	93.0, 95.5	0.9%	
		Victim	86	5.8%	4.5, 7.0		
		Total	1554	100.0%			
	Third	Not victim	1280	91.5%	89.7, 93.4	1.1%	
		Victim	106	8.5%	6.6, 10.3		
		Total	1386	100.0%			
	Fourth	Not victim	1246	90.3%	88.5, 92.3	1.5%	
		Victim	126	9.6%	7.7, 11.5		
		Total	1372	100.0%			
	Other	Not victim	420	88.9%	85.8, 92.0	1.2%	
		Victim	49	11.1%	8.0, 14.2		
		Total	469	100.0%			
Living Arrangements	Lives alone	Not victim	1197	92.9%	91.3, 94.6	1.18%	0.0083
		Victim	79	7.0%	5.4, 8.7		
		Total	1276	100.0%			
	Lives with one or both parent(s)	Not victim	1554	95.4%	94.3, 96.5	1.73%	
		Victim	69	4.6%	3.5, 5.7		
		Total	1623	100.0%			
	Lives with romantic partner	Not victim	807	91.6%	88.8, 94.4	0.69%	
		Victim	64	8.4%	5.6, 11.2		
		Total	871	100.0%			
	Lives with a roommate(s) (not	Not victim	2673	92.6%	91.5, 93.7	1.32%	

	a sexual or romantic partner)						
		Victim	199	7.4%	6.3, 8.5		
		Total	2872	100.0%			
Housing Location	Lives off campus	Not victim	4556	92.7%	91.9, 93.6	1.2%	**0.0263**
		Victim	331	7.3%	6.4, 8.1		
		Total	4887	100.0%			
	Lives on campus in student residence/housing	Not victim	1662	94.8%	93.4, 96.3	1.6%	
		Victim	79	5.2%	3.7, 6.6		
		Total	1741	100.0%			
Importance of Religion Dichotomized	Not at all or not very important	Not victim	4344	93.1%	92.2, 93.8	1.2%	0.4466
		Victim	308	6.9%	6.2, 7.8		
		Total	4652	100.0%			
	Fairly or very important	Not victim	1895	93.7%	92.2, 95.2	1.5%	
		Victim	103	1.3%	4.8, 7.8		
		Total	1998	100.0%			
Wealth	Very wealthy or Quite wealthy	Not victim	1424	91.5%	89.9, 93.1	1.6%	**0.0012**
		Victim	120	8.5%	6.9, 10.1		
		Total	1544	100.0%			
	Average	Not victim	3660	94.4%	93.5, 95.3	1.3%	
		Victim	202	5.6%	4.7, 6.5		
		Total	3862	100.0%			
	Not so wealthy or Not wealthy at all	Not victim	1155	91.8%	89.8, 93.7	0.9%	
		Victim	89	8.2%	6.3, 10.2		
		Total	1244	100.0%			
Sexual Orientation Dichotomized	Not 100% heterosexual	Not victim	2081	89.8%	88.2, 91.4	0.9%	**<.0001**
		Victim	214	10.2%	8.6, 11.8		
		Total	2295	100.0%			
	100% heterosexual	Not victim	4152	95.0%	94.3, 95.8	1.5%	
		Victim	197	5.0%	4.2, 5.7		
		Total	4349	100.0%			
Marijuana Use Dichotomized	Not heavy use (less than 3 times in past 30 days) or none	Not victim	5420	93.8%	93.0, 94.6	1.2%	**<.0001**
		Victim	314	6.2%	5.4, 6.9		
		Total	5734	100.0%			
	Heavy use (>or=3 times in the past 30 days)	Not victim	791	89.4%	87.2, 91.6	0.7%	
		Victim	94	10.6%	8.4, 12.8		
		Total	885	100.0%			
Alcohol Use Dichotomized	Not heavy (≥ 5 drinks in a row on <3 days in the past 30 days) or none	Not victim	4072	94.2%	93.3, 95.0	1.2%	**0.0003**
		Victim	224	5.8%	4.9, 6.7		
		Total	4296	100.0%			
	Heavy use (≥ 5 drinks in a row on ≥ 3 days in the past 30 days)	Not victim	2156	91.3%	89.9, 92.7	1.1%	
		Victim	186	8.7%	7.3, 10.0		
		Total	2342				
Ever had vaginal intercourse	No	Not victim	1354	97.7%	96.8, 98.6	0.9%	**<.0001**
		Victim	29	2.3%	1.4, 3.2		
		Total	1383	100.0%			

	Yes	Not victim	4715	92.2%	91.3, 93.1	1.2%	
		Victim	368	7.8%	6.9, 8.7		
		Total	5083	100.0%			
	Prefer not to answer	Not victim	170	91.1%	86.2, 95.9	7.1%	
		Victim	14	8.9%	4.0, 13.8		
		Total	184	100.0%			
Use of condom during last vaginal intercourse	Not Applicable	Not victim	1524	96.9%	95.9, 97.9	1.6%	**<.0001**
		Victim	43	3.1%	2.1, 4.1		
		Total	1567				
	No	Not victim	2080	91.3%	89.8, 92.8	0.6%	
		Victim	187	8.7%	7.2, 10.2		
		Total	2267	100.0%			
	Yes	Not victim	2614	92.9%	91.9, 93.9	0.4%	
		Victim	180	7.1%	6.0, 8.1		
		Total	2794	100.0%			
Number of sexual partners categorized	Not applicable/Prefer not to answer on whether or not had sex	Not victim	170	91.1%	86.2, 95.5	7.1%	**<.0001**
		Victim	14	8.9%	4.0, 13.8		
		Total	184	100.0%			
	One or less partners in the past 12 months	Not victim	4324	95.2%	94.4, 95.9	0.7%	
		Victim	193	4.8%	4.1, 5.6		
		Total	4517	100.0%			
	Two partners in the past 12 months	Not victim	698	91.5%	88.6, 94.4	0.4%	
		Victim	53	8.5%	5.6, 11.4		
		Total	751	100.0%			
	Three or more partners in the past 12 months	Not victim	1024	87.2%	85.2, 89.2	0.3%	
		Victim	149	12.8%	10.8, 14.8		
		Total	1173	100.0%			

* The chi-square p-value is comparing the difference in prevalence rates of non-consensual sex across variable categories.

Table 5: Weighted Prevalence Rates and 95% Confidence Limits of Risk of Depression by Participant Characteristics (N=6939)

Variable	Level	Risk of Depression	Unweighted Frequency	Weighted Percentage	95% Confidence Limits for Percent	Missing (%)	Chi-Square P-value*
Non-consensual sex	Not a victim	Not at risk	4056	64.8%	63.5, 66.1	0.1%	**<.0001**
		At risk	2176	35.2%	33.9, 36.5		
		Total	6232	100.0%			
	Victim	Not at risk	182	43.9%	38.4, 49.5	0.2%	
		At risk	228	56.1%	50.5, 61.6		
		Total	410	100.0%			
Ethnicity	Not white	Not at risk	436	58.0%	54.0, 61.9	0.3%	**0.0032**
		At risk	301	42.0%	38.1, 45.9		
		Total	737	100.0%			
	White	Not at risk	3853	64.1%	62.7, 65.4	0.2%	
		At risk	2131	35.9%	34.6, 37.3		
		Total	5984	100.0%			
Grades	Below average grades	Not at risk	798	57.8%	55.0, 60.4	.3%	**<.0001**
		At risk	591	42.2%	39.6, 45.0		
		Total	1389	100.0%			
	Above average grades	Not at risk	3491	64.8%	63.3, 66.1	.2%	
		At risk	1841	35.2%	33.9, 36.7		
		Total	5332	100.0%			
Age	17-19	Not at risk	1654	59.9%	57.9, 61.9	.4%	**0.0017**
		At risk	1038	40.1%	38.1, 42.0		
		Total	2692	100.0%			
	20-24	Not at risk	2302	64.8%	63.1, 66.4	.2%	
		At risk	1245	35.2%	33.6, 36.9		
		Total	3547	100.0%			
	25-29	Not at risk	333	67.1%	62.0, 72.2	0%	
		At risk	149	32.9%	27.8, 37.9		
		Total	482	100.0%			
Year of Study	First	Not at risk	1140	58.3%	55.9, 60.7	.2%	**<.0001**
		At risk	756	41.7%	39.3, 44.0		
		Total	1896	100.0%			
	Second	Not at risk	989	62.3%	59.7, 64.8	.4%	
		At risk	573	37.7%	35.2, 40.3		
		Total	1562	100.0%			
	Third	Not at risk	907	64.9%	62.1, 67.6	.1%	
		At risk	491	35.1%	32.4, 37.9		
		Total	1398	100.0%			
	Fourth	Not at risk	953	68.6%	65.9, 71.3	.3%	
		At risk	437	31.4%	28.7, 34.1		
		Total	1390	100.0%			
	Other	Not at risk	300	63.0%	58.4, 67.6	0%	
		At risk	175	37.0%	32.4, 41.6		
		Total	475	100.0%			
Living Arrangements	Lives alone	Not at risk	784	60.6%	58.1, 63.9	0.3%	0.0797
		At risk	503	39.1%	36.1, 41.9		
		Total	1287	100.0%			
	Lives with one or both parent(s)	Not at risk	1032	61.9%	59.3, 64.4	0.1%	
		At risk	617	38.1%	35.6, 40.7		
		Total	1649	100.0%			
	Lives with romantic partner	Not at risk	589	65.7%	61.9, 69.4	0%	
		At risk	288	34.3%	30.6, 38.0		
		Total	877	100.0%			
	Lives with a roommate(s) (not a sexual or romantic partner)	Not at risk	1880	64.5%	62.6, 66.4	0.3%	
		At risk	1020	35.5%	33.6, 37.4		

		Total	2900	100.0%			
Housing Location	Lives off campus	Not at risk	3163	63.7%	62.2, 65.2	0.2%	0.3077
		At risk	1774	36.3%	34.8, 37.8		
		Total	4937	100.0%			
	Lives on campus in student residence/housing	Not at risk	1110	62.2%	59.7, 64.7	0.4%	
		At risk	652	37.8%	35.3, 40.3		
		Total	1762	100.0%			
Importance of Religion Dichotomized	Not at all or not very important	Not at risk	2971	63.1%	61.6, 64.6	0.2%	0.5338
		At risk	1727	36.9%	35.4, 38.4		
		Total	4698	100.0%			
	Fairly or very important	Not at risk	1318	63.9%	61.6, 66.4	0.2%	
		At risk	705	36.1%	33.7, 38.4		
		Total	2023	100.0%			
Wealth	Very wealthy or Quite wealthy	Not at risk	1052	67.2%	64.7, 69.7	0.3%	**<.0001**
		At risk	512	32.8%	30.3, 35.3		
		Total	1564	100.0%			
	Average	Not at risk	2552	65.1%	63.5, 66.7	0.2%	
		At risk	1353	34.9%	33.3, 36.5		
		Total	3905	100.0%			
	Not so wealthy or Not wealthy at all	Not at risk	685	54.0%	50.9, 57.1	0.2%	
		At risk	567	46.0%	42.9, 49.1		
		Total	1252	100.0%			
Sexual Orientation Dichotomized	Not 100% heterosexual	Not at risk	1297	55.4%	53.1, 57.6	0.2%	**<.0001**
		At risk	1013	44.6%	42.4, 46.9		
		Total	2310	100.0%			
	100% heterosexual	Not at risk	2990	67.6%	66.1, 69.1	0.2%	
		At risk	1415	32.4%	30.9, 33.9		
		Total	4405	100.0%			
Marijuana Use Dichotomized	Not heavy use (less than 3 times in past 30 days) or none	Not at risk	3773	64.7%	63.4, 66.1	0.1%	**<.0001**
		At risk	2024	35.3%	33.9, 36.6		
		Total	5797	100.0%			
	Heavy use (>or=3 times in the past 30 days)	Not at risk	497	54.5%	50.9, 58.0	0%	
		At risk	394	45.5%	41.9, 49.1		
		Total	891	100.0%			
Alcohol Use Dichotomized	Not heavy (≥ 5 drinks in a row on <3 days in the past 30 days) or none	Not at risk	2761	62.9%	61.4, 64.6	0.1%	0.4547
		At risk	1581	37.0%	35.4, 38.6		
		Total	4342	100.0%			
	Heavy use (≥ 5 drinks in a row on ≥ 3 days in the past 30 days)	Not at risk	1520	64.0%	61.9, 66.1	.08%	
		At risk	846	36.0%	33.9, 38.1		
		Total	2366	100.0%			
Ever had vaginal intercourse	No	Not at risk	889	63.2%	60.4, 66.0	0.3%	0.6053
		At risk	502	36.8%	34.0, 39.6		
		Total	1391	100.0%			
	Yes	Not at risk	3285	63.6%	62.1, 64.9	0.1%	
		At risk	1853	36.4%	35.0, 37.9		
		Total	5138	100.0%			

	Prefer not to answer	Not at risk	115	59.7%	51.6, 67.7	2.6%	
		At risk	77	40.3%	32.3, 48.4		
		Total	192	100.0%			
Use of condom during last vaginal intercourse	Not Applicable	Not at risk	1004	62.7%	60.1, 65.3	0.6%	**0.0443**
		At risk	579	37.3%	34.6, 39.9		
		Total	1583	100.0%			
	No	Not at risk	1407	61.7%	59.4, 63.9	0.04%	
		At risk	873	38.3%	36.1, 40.5		
		Total	2280	100.0%			
	Yes	Not at risk	1845	65.3%	63.3, 67.2	0.04%	
		At risk	959	34.7%	32.8, 36.6		
		Total	2804	100.0%			
Number of sexual partners categorized	Not applicable/Prefer not to answer on whether or not had sex	Not at risk	115	59.7%	51.6, 67.7	2.6%	**0.0020**
		At risk	77	40.3%	32.3, 48.4		
		Total	192	100.0%			
	One or less partners in the past 12 months	Not at risk	2979	65.2%	63.6, 66.7	0.2%	
		At risk	1560	34.8%	33.3, 36.4		
		Total	4539	100.0%			
	Two partners in the past 12 months	Not at risk	460	60.8%	56.8, 64.7	0%	
		At risk	294	39.2%	35.3, 43.2		
		Total	754	100.0%			
	Three or more partners in the past 12 months	Not at risk	700	59.1%	56.1, 62.1	0%	
		At risk	477	40.9%	37.9, 43.9		
		Total	1177	100.0%			

* The chi-square p-value is comparing the difference in prevalence rates of non-consensual sex across variable categories.

Table 6: Odds Ratios and 95% Confidence Intervals from Unadjusted Logistic Regressions to Determine Factors Associated with Non-Consensual Sex (N=6939)

Variable	**Level (For Categorical Variables)**	**Unadjusted Odds Ratio**	**95% Confidence Interval for Odds Ratio**	**P-value**
Age		1.13	1.04, 1.22	**0.0038**
Hours worked weekly		1.01	0.99, 1.03	0.2652
BHSS Score		1.04	1.03, 1.06	**<0.0001**
SSS Score		0.99	0.98, 0.99	**0.0086**
Grades				
	Below average grades	1.00	-	-
	Above average grades	0.79	0.55, 1.12	0.1872
Ethnicity				
	Not white	1.00	-	-
	White	1.16	0.89, 1.52	0.2760
Living Arrangements				
	I live alone	1.00	-	-
	I live with one or both of my parents	0.67	0.46, 0.96	**0.0311**
	I live with my partner	1.21	0.91, 1.61	0.1865
	I live with a roommate(s) (not a sexual or romantic partner)	1.09	0.74, 1.59	0.6758
Housing Location				
	I live off-campus	1.00	-	-
	I live on-campus	0.69	0.48, 0.98	**0.0388**
Importance of Religion Dichotomized				
	Not at all or not very important	1.00	-	-
	Fairly or very important	0.88	0.70, 1.12	0.3045
Wealth				
	Very wealthy or Quite wealthy	1.00	-	-
	Average	0.64	0.45, 0.89	**0.0101**
	Not so wealthy or Not wealthy at all	0.98	0.68, 1.41	0.9084
Sexual Orientation Dichotomized				
	Not 100% heterosexual	1.00	-	**-**
	100% heterosexual	0.46	0.31, 0.71	**0.0003**
Marijuana Use Dichotomized				
	Not heavy use (less than 3 times in the past 30 days)	1.00	-	**-**
	Heavy use (≥ 3 times in the past 30 days)	1.77	1.38, 2.26	**<0.0001**
Alcohol Use Dichotomized				
	Not heavy (≥ 5 drinks in a row on <3 days in the past 30 days)	1.00	-	**-**
	Heavy use (≥ 5 drinks in a row on ≥ 3 days in the past 30 days)	1.51	1.33, 1.70	**<0.0001**
Ever Had Vaginal Intercourse				
	No	1.00	-	-
	Yes	3.47	2.09, 5.77	**<0.0001**
	I prefer not to answer	3.95	1.75, 8.92	**0.0010**
Use of Condom During Last Vaginal Intercourse				
	No	1.00	-	-
	Yes	0.79	0.61, 1.03	0.0776
Number of Sexual Partners				

Categorized				
	One or less partners in the past 12 months	1.00	-	-
	Two partners in the past 12 months	1.89	1.30, 2.75	**0.0009**
	Three or more partners in the past 12 months	2.92	2.27, 3.76	**<0.0001**

Table 7: Odds Ratios and 95% Confidence Intervals from Unadjusted Logistic Regressions to Determine Factors Associated with Risk of Depression (N=6939)

Variable	Level (For Categorical Variables)	Unadjusted Odds Ratio	95% Confidence Interval for Odds Ratio	P-value
Non-Consensual Sex	No	1.00	-	
	Yes	2.32	1.76, 3.06	**<.0001**
Age		0.96	0.94, 0.99	**0.0039**
Grades				
	Below average grades	1.00	-	-
	Above average grades	0.69	0.62, 0.76	**<0.0001**
Hours worked weekly		1.01	1.00, 1.02	**0.0387**
BHSS Score		1.10	1.09, 1.11	**<0.0001**
SSS Score		0.92	0.92, 0.93	**<0.0001**
Ethnicity				
	Not white	1.00	-	-
	White	0.77	0.69, 0.87	**<0.0001**
Employment Status				
	Not employed	1.00	-	-
	Employed	0.96	0.87, 1.07	0.4643
Living Arrangements				
	I live alone	1.00	-	-
	I live with one or both of my parents	0.94	0.76, 1.16	0.5756
	I live with my partner	0.79	0.68, 0.92	**0.0030**
	I live with a roommate(s) (not a sexual or romantic partner)	0.84	0.72, 0.99	**0.0351**
Housing Location				
	I live off-campus	1.00	-	-
	I live on-campus	1.01	0.99, 1.23	0.0779
Importance of Religion Dichotomized				
	Not at all or not very important	1.00	-	-
	Fairly or very important	0.95	0.89, 1.01	0.1183
Wealth				
	Very wealthy or Quite wealthy	1.00	-	-
	Average	1.10	0.94, 1.27	0.2275
	Not so wealthy or Not wealthy at all	1.76	1.50, 2.06	**<0.0001**
Sexual Orientation Dichotomized				
	Not 100% heterosexual	1.00	-	**-**
	100% heterosexual	0.59	0.49, 0.71	**<0.0001**
Marijuana Use Dichotomized				
	Not heavy use (less than 3 times in the past 30 days)	1.00	-	**-**
	Heavy use (≥ 3 times in the past 30 days)	1.51	1.24, 1.85	**<0.0001**
Alcohol Use Dichotomized				
	Not heavy (≥ 5 drinks in a row on <3 days in the past 30 days)	1.00	-	**-**
	Heavy use (≥ 5 drinks in a row on ≥ 3 days in the past 30 days)	0.95	0.80, 1.120	0.5207
Ever Had Vaginal Intercourse				
	No	1.00	-	-
	Yes	0.98	0.88, 1.08	0.6730
	I prefer not to answer	1.12	0.75, 1.65	0.5828
Use of Condom During Last Vaginal Intercourse				
	No	1.00	-	-
	Yes	0.85	0.76, 0.96	**0.0100**

Number of Sexual Partners Categorized				
	One or less partners in the past 12 months	1.00	-	-
	Two partners in the past 12 months	1.19	0.93, 1.55	0.1664
	Three or more partners in the past 12 months	1.28	1.05, 1.55	**0.0141**

Table 8: Odds Ratios and 95% Confidence Intervals from the Adjusted Logistic Regression to Determine the Independent Association between Non-Consensual Sex and Risk of Depression (N=6939)

Variable	**Level (For Categorical Variables)**	**Adjusted Odds Ratio**	**95% Confidence Interval for Odds Ratio**	**P-value**
Non-consensual sex				
	No	1.00	-	-
	Yes	2.11	1.57, 2.84	**<0.0001**
Age		0.93	0.91, 0.96	**<0.0001**
Grades				
	Below average grades	1.00	-	
	Above average grades	0.75	0.64, 0.88	**0.0005**
Hours worked weekly		1.01	1.00, 1.02	**0.0189**
BHSS Score		1.06	1.05, 1.07	**<0.0001**
SSS Score		0.93	0.92, 0.93	**<0.0001**
Ethnicity				
	Not white	1.00	-	
	White	1.05	0.89, 1.25	0.5548
Living Arrangements				
	I live alone	1.00	-	-
	I live with one or both of my parents	0.85	0.68, 1.05	0.1291
	I live with my partner	0.63	0.51, 0.78	**<0.0001**
	I live with a roommate(s) (not a sexual or romantic partner)	0.94	0.74, 1.19	0.5913
Importance of Religion Dichotomized				
	Not at all or not very important	1.00	-	-
	Fairly or very important	1.26	1.19, 1.35	**<0.0001**
Wealth				
	Very wealthy or quite wealthy	1.00	-	-
	Average	1.03	0.87, 1.22	0.7729
	Not so wealthy or not wealthy at all	1.23	1.02, 1.49	0.0345
Sexual Orientation Dichotomized				
	Not 100% heterosexual	1.00	-	-
	100% heterosexual	0.75	0.64, 0.89	**0.0007**
Marijuana Use Dichotomized				
	Not heavy use (less than 3 times in the past 30 days)	1.00	-	-
	Heavy use (≥ 3 times in the past 30 days)	1.28	1.06, 1.54	**0.0105**
Use of Condom During Last Vaginal Intercourse				
	No	1.00	-	-
	Yes	0.95	0.81, 1.13	0.5675
Number of Sexual Partners Categorized				
	One or less partners in the past 12 months	1.00	-	-
	Two partners in the past 12 months	1.09	0.81, 1.48	0.5555
	Three or more partners in the past 12 months	1.18	1.01, 1.39	**0.0394**

CHAPTER 7 DISCUSSION

7.1 PURPOSE OF STUDY

This study investigated an underexplored area, and one which to date had yet to be explored in Canada. The purpose was to determine the prevalence of risk of depression and the prevalence of non-consensual sex among females attending universities in Maritime Canada, as well as to determine factors associated with, and the unique relationship between, risk of depression and non-consensual sex. While other studies have attempted to explore this relationship,[12,80] to the best of our knowledge, none has collected information on a broad range of important covariates, has narrowed the definition of victimization to only non-consensual sex within a specific time frame (i.e., while attending university), or has examined the issue in Maritime Canada.

7.2 DISCUSSION OF RESULTS

The prevalence of risk of depression among undergraduate females under the age of 30 who were attending university in Maritime Canada was found to be 36.7%, showing that over a third of female undergraduate students are struggling with at least symptoms of depression. As depression and risk of depression are measured across studies in different ways using different instruments, it is difficult to compare the results of the present study with other studies examining depression among students. However, this rate is consistent with one 2013 U.S. study that found that 33.4% of university students nationwide indicated that they felt so depressed that it was difficult to function.[104] In the univariate analysis of the current study, this rate was found to vary significantly depending on which year of study students were in with younger students and first year students having a higher prevalence when compared to upper year students. This could suggest that risk of depression improves over the course of university or it could mean that many students who are depressed tend to drop out early on in their university careers; research has shown that the highest rates of drop out occur during first and second year of university.[105]

The prevalence of non-consensual sex was found to be 6.8% among female undergraduates attending universities in Maritime Canada. This rate is relatively consistent with findings by Koss and colleagues in 1987[10] who found that 6% of their study population of 6,159 male and female students from 32 U.S. higher education

schools had reported attempted rape in the past year. As sexual victimization is higher among females,[42] the slightly higher prevalence rate in this study is understandable. Also, because the current study narrowed the definition of sexual victimization to only non-consensual sex while attending university, it is understandable that the prevalence would be lower than studies that used a variety of types of sexual assault over the lifespan.[9-11] The prevalence of non-consensual sex while attending university was found to vary significantly by age and by year of study with the oldest students, and those in their fourth year of study, having the highest prevalence. As the question measuring victimization asks about non-consensual sex while attending university, it is very likely that those who are older and have been at university longer would be more likely to be victimized. Having knowledge of the prevalence statistics produced from this study can help university officials recognize that depression symptoms and non-consensual sex are indeed common on Maritime campuses. This knowledge will also help officials to identify and specifically target higher risk groups such as first-year students, individuals of ethnic minorities, and those whose grades are suffering. Research has shown that both sexual victimization and depression are linked with serious negative outcomes[8, 44, 48, 72] and therefore, should be saught to be minimized as much as possible on campus. For example, sexual victimization has been linked to post-traumatic stress disorder[44] and suicide[48] while depression has been linked to poor school outcomes[8] and increased risk of death.[72]

Both demographic and modifiable factors were found to be associated with risk of depression in the bivariate analysis. In terms of demographic factors, the present study found that white people are at decreased odds of risk of depression compared to non-whites, and as social support increases, the likelihood of being at risk of depression decreases. This is consistent with past research on demographic factors related to depression.[66,87] In terms of risk behaviours, substance abuse, and risky sexual behaviors were both associated with increased risk of depression, again consistent with past research.[97,99] Demographic and modifiable variables found to be associated with being a victim of non-consensual sex at the bivariate level included being a minority sexual orientation versus being heterosexual, living alone versus living with a parent, substance

abuse (both marijuana and alcohol), and having multiple sexual partners. These findings present new information as well as being consistent with past research.[16,19]

Examining the results of the multivariate model, many variables remained significantly associated with risk of depression even after controlling for important confounders and covariates. For example, women who were heterosexual were found to be at decreased odds of depression compared to minority sexual orientations. Also, those who scored higher on the barriers to help-seeking scale, as well as those who abuse marijuana were more likely to be at risk of depression. This presents an interesting finding as it further indicates that there should be increased efforts to target prevention and intervention strategies towards some groups of individuals (e.g., minority sexual orientations). Furthermore, targeting modifiable factors such as substance use and help-seeking behaviour could serve as an indirect way to reduce the prevalence of risk of depression.

The major finding of this study was that after controlling for demographics, substance use, and risky sexual behaviours, women who were sexually victimized were found to be twice as likely to be at risk of depression compared to those who hadn't been victimized. Research has shown that women who are sexually victimized as children are more likely to internalize their emotions, resulting in more issues with depression in adulthood.[53] This study has shown that the same possibly holds true for women who are victimized as adults while attending university. However, as this study is cross-sectional data, it is plausible that women who are victimized, as a result of their experience participate in activities such as substance abuse and risky sexual behaviours, both of which are linked to depression.[69] The strength of the relationship between non-consensual sex and risk of depression in female undergraduates under 30 should urge university officials that they should not only try to prevent sexual victimization; it also indicates that psychological well-being of those who have been victimized needs to be a priority and requires long term follow-up.

University and public health officials can use the results of this study to approach the issues of non-consensual sex and depression on campus in two major ways: 1. Indirect methods, targeting factors found to be associated with non-consensual sex in order to reduce the risk of being victimized and becoming depressed 2. Direct methods, including

targeting factors associated with depression to reduce the prevalence of depression on campus and also identifying victims of non-consensual sex, identifying their levels of depression and providing them with the mental health support needed.

Indirect methods would involve targeting the modifiable factors associated with victimization in order to reduce the risk of being victimized on campus and as a result minimizing the prevalence of depression. Understanding the demographic factors associated with risk of depression and non-consensual sex can also help university officials target and tailor their intervention tactics, while recognizing risk behaviors can help to target external factors that can indirectly address the issue of depressive symptoms and sexual victimization among students. For example, with regard to reducing victimization, living with a parent versus living alone, living on campus as compared to off campus, increased social support, lower substance use, and less risky sexual activities were all associated with decreased risk of victimization. Opportunity theory[55] suggests that people that are put in more risky situations are more likely or have an increased oppportunity to be victimized. The same could hold true for sexual victimization in which women who live alone, who live off-campus or who use substances are more likely to be sexually victimized partly because of their exposure to situations where these types of crimes are more likely to occur, making them more vulnerable targets for perpatrators. Knowing exactly which variables are related to being victimized can help university and public health officials target prevention tactics before victimization occurs, such as encouraging women to live with someone, to live on campus, and to reduce their use of substances.

Direct methods would include targeting modifiable factors associated with risk of depression and as a result reduce the prevalence of depressive symptoms among all students on campus. An example of a prevention strategy not offered at Maritime universities which has been found to be effective for symptoms of depression among undergraduate students is the Action for Depression Awareness, Prevention, and Treatment (ADAPT) program.[106] This program incorporates a community psychology perspective and maintains that symptoms of depression in students are best understood and addressed within the context of a stressful educational environment. The university is

viewed as a system that can provide positive resources while serving to alleviate the problems that result from depression.

Direct methods would include better identifying victims of sexual assault, better identifying depression in these victims, and increasing mental health support for those on campus who have been victimized. Having the knowledge that women who are victim of non-consensual sex while attending a university are more than twice as likely as other women to be at risk of depression could directly influence the university to shift focus and acknowledge that a victim's needs should not only be met physically but mentally, and that they should be followed over the long-term.

To better identify victims of non-consensual sex in order to provide the needed supports, officials could take measures to further encourage students to report sexual assault to university health authorities. Research has demonstrated that only 6 of every 100 incidents of sexual assault in Canada are reported to the police[39] and it may be presumed that many sexual assaults also go unreported to sexual health services at universities. Having a more accurate estimate of the prevalence rate of non-consensual sex based on the results of this survey can help university authorities recognize the need to implement more programs to further encourage students to report sexual victimization to the police as well as the university health centres. Research in the U.S. has shown that females who have been victim of non-consensual sex before the age of 18 who wait longer than one month to report their victimization are at increased risk of developing mental health issues such as posttraumatic stress disorder as well as major depressive disorder, even after controlling important factors such as frequency of rape and the relationship the victim had with the perpetrator.[107]

Also, to further encourage reporting of victimization in order to identify victims as well as depression, universities could provide a more positive and supportive environment for students regarding depression and sexual assault. Research has shown that in the areas of bullying and physical violence in adolescent high school aged children, students who perceived the people around them (i.e., teachers and other staff) to be supportive were more likely to report that they would seek help if they were bullied or threatened physically.[108] It is plausible to assume that creating a more supportive university environment could encourage students to report symptoms of depression and/or sexual

victimization so that they can receive the needed help. With regards to help-seeking and mental health in university students, research has supported the notion that stigma is a barrier for students seeking help for psychological issues.[109] Encouraging a climate where people experiencing psychological distress, such as symptoms of depression, is supported and is known to be quite common among students, could help in reducing stigma and encouraging help-seeking in students.

7.3 STRENGTHS AND LIMITATIONS

The present study possessed major strengths at all stages of the research, most notably piloting the survey with a subset of the population of interest prior to collecting data, using a well validated instrument to measure the outcome of interest (CES-D),[13] collecting information on multiple important confounding variables and covariates, using survey weights to ensure representativeness, and using multiple imputation to compensate for the low level of missing data.

This study also has limitations. All results of the proposed study were interpreted with the following limitations in mind. First, it was not possible to determine causality between current risk of depression and non-consensual sex while attending university due to the inability to establish a temporal sequence. The survey measured current risk of depression (previous week) and experiences of non-consensual sex at any time during university. It is tempting to conclude that non-consensual sex preceded current risk of depression. However, it is possible, for example, that those who are depressed are more likely to perform high risk behaviours and be placed in situations where being victimized is more likely. This limitation is inherent to the study's cross-sectional design and can only be addressed by making the appropriate inferences when reporting results. The intention of this study was to only *describe* the population of interest and *describe* the association between the variables of interest. This limitation was partly addressed by the wording of the item measuring current risk of depression, with the measurement period being symptoms in the past 7 days, though of course symptoms of depression may have been present for much longer than 7 days.

Second, the researchers collected data using a self-report survey. This is subjective rather than objective measurement and can lead to inaccurate responses. This can be a more serious issue with some types of questions as opposed to others. For

example, the item measuring non-consensual sex while at university is highly sensitive and it is possible that many victims of non-consensual sex were not comfortable disclosing this information *at all* or *truthfully*. The researchers addressed this issue by assuring participants of anonymity and confidentiality in the consent form. Also, research has demonstrated that individuals are more likely to respond to highly sensitive items more truthfully (i.e., less social desirability bias) when the questions are asked online.[110-114] Finally, to address this limitation, the researchers also performed the pilot test of the entire survey to ensure construct validity of the items and to ensure that potential participants did not find survey items objectionable.

A third limitation was that researchers only offered the survey online instead of in multiple formats. However, research has shown that there are significant advantages to conducting a survey online including convenience for the participant and it allows for more reach.[115] One issue with an online survey is that people likely respond differently to questions asked online than they do to questions asked over the telephone.[116-118] The researchers indirectly addressed this limitation in the consent form by explaining the importance of the research to the participant (i.e., how information obtained from the survey could be used to inform university policy) in order to encourage them to answer questions in the survey as carefully and as accurately as possible.

A fourth limitation of this study is that it is subject to volunteer bias in which those who decide to participate in the survey are systematically different from those who do not participate in the survey. This can lead to the study population being unrepresentative of the target population of interest. Statistically weighting the data by age and sex helped to ensure that the study population obtained was more representative of the entire target population.

A fifth limitation was a lack of collection of at least one important potential confounder that could be related to risk of depression as well as experiencing non-consensual sex such as previous history of sexual assault (i.e., childhood sexual assault).[119]

Finally, response rates from the participating universities were not as high as the researchers had originally hoped, obtaining a response rate of 20.4% overall. As mentioned, this can result in non-response bias which can greatly reduce generalizability.

Upon examination of the response rates by sex, however, 66% of the participants are female. Since only females were involved in this study, this high percentage of female participants helps to ensure that the study population is representative of the female undergraduate population. Also, the data from the participating universities was combined in order to obtain enough power. In order to ensure representativeness, statistical weights were created based on age, sex, and university which allow for more accurate and representative estimates of the true population parameters. The effective response rate is likely larger as the survey may not have reached all of the target population because of inactive email accounts and some invitation emails not being sent or read.[84]

7.4 FUTURE DIRECTIONS

There are various directions that researchers could take in the future in order to improve upon the present study. There are also multiple topics researchers could study in order to extend the literature surrounding sexual victimization and depression in undergraduate students.

In order to improve on the present study, it is important for future researchers to collect information on other important covariates and confounding variables, most notably information on participants' past sexual victimization experiences (e.g., history of childhood sexual victimization). As research shows that those who were victimized as children are more likely to be victimized and/or depressed as adults,[77,78,119] this would be important information to potentially control for in a multiple regression model predicting depression.

Research could also examine the relationship of various other types of sexual victimization in relation to depression or risk of depression (e.g., attempted rape, sexual assault, sexual touching). Since research has demonstrated that various types of sexual victimization have different correlates,[79] it is plausible that the magnitude of their relationship with depression is different. Also, it is likely that less aggressive sexual victimization experiences (e.g., verbal sexual assault) are more common on university campuses, and would likely be of great concern to university officials.

Furthermore, the current literature would benefit from examining the relationship between specific forms of sexual victimization and depression longitudinally. This could

be done by following a cohort of individuals who have been victimized and those who have not been victimized and determining who is more likely to develop depression or symptoms of depression. This would help to establish more concrete evidence about the direction of the relationship between depression and sexual victimization. It would also help shed light on whether or not the prevalence of sexual victimization and risk of depression among students fluctuate throughout the academic year. For example, past research on students' well-being has shown that the beginning of the academic year serves as an acute stressor for first-year university students, especially for female students.[120] However, as the year progresses, well-being generally improves. It is plausible to hypothesize that depression likely fluctuates throughout the academic year as well, and intervention and prevention strategies among university officials should be timed accordingly.

Finally, it is important for researchers to come to a consensus and to use consistent measurement tools across studies. Attempting to compare results on sexual victimization and depression across studies becomes problematic when different measurement tools are used that potentially measure different constructs. For example, while the present study measured risk of depression, other studies measured clinical depression[3] or simply symptoms of depression.[5]

7.5 CONCLUSION

This study, the first of its kind conducted in Canada, has provided empirical evidence regarding issues on campuses at Maritime universities that have been previously unknown. This research is unique in that a number of covariates were collected and the definition of sexual victimization was restricted to non-consensual sex at university. The information obtained from this study can be used to inform both policy and practice at universities in Maritime Canada. Results of this study have shed light on very important, unknown issues at eight universities in Maritime Canada and has determined factors associated with depression in female undergraduates as well as being victim of non-consensual sex while attending university in order to better inform where university health and mental health services should target their prevention and intervention tactics. This study has also established that even after controlling for related factors, females who are victim of non-consensual sex while attending university are still more than twice as

likely to be at risk of depression than those who have not been victimized. This points to the possible unmet need for more or different mental health support for victims at universities in Maritime Canada. Highlighting this unmet need will help university officials make informed decisions about mental health services at their respective university.

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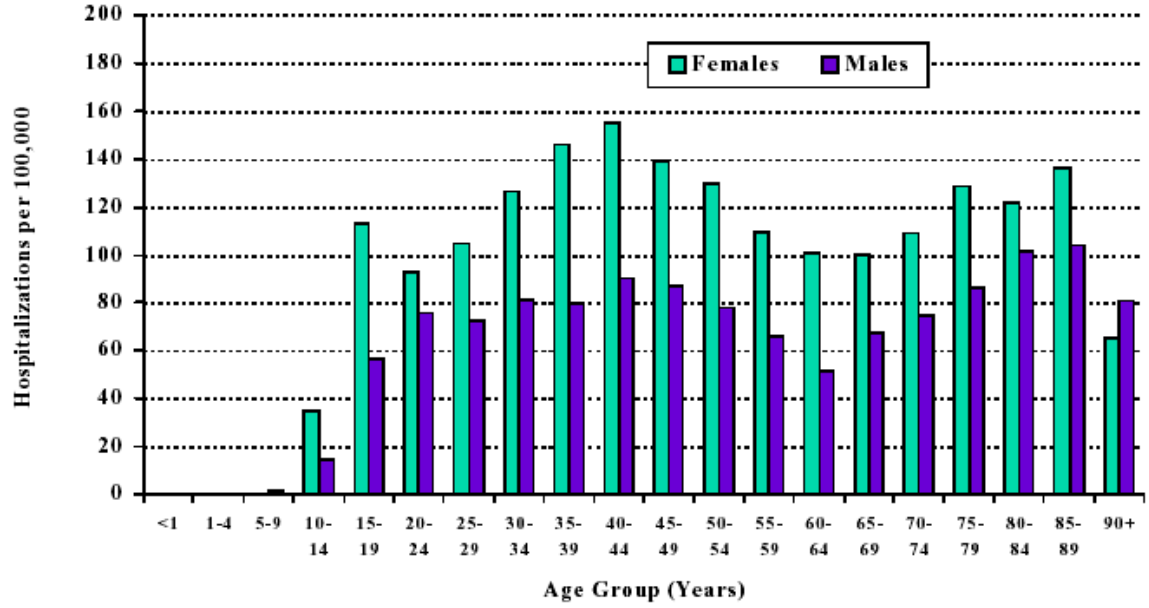
APPENDIX A Statistics on Sexual Assault in Canada

2004		
	Incidents (in thousands)	**Rate per 100,000 (population 15 and over)**
Total	512	1,977
Sex		
Females	427	3,248
Males	85	664
Age (years)		
15 to 24	238	5,563
25 to 34	128	2,892
35 to 44	89	1,724
45 to 54	F	F
55 and over	F	F
Main Activity		
Working	252	1,687
Looking for work	F	F
Going to school	177	5,548
Household work	F	F
Retired	F	F
Other	F	F
Don't know/Not stated	F	F

F=too unreliable to be published
Notes: Figures may not add to total due to rounding. Excludes incidents of sexual assault involving spouses.
Source: Statistics Canada, General Social Survey, 1999 and 2004.

APPENDIX B Hospitilizations for Depression in Canada by Sex and Age

Figure 2-1 Hospitalizations for major depressive disorder* in general hospitals per 100,000 by age group, Canada, 1999/2000



* Using most responsible diagnosis only

Source: Centre for Chronic Disease Prevention and Control, Health Canada using data from Hospital Morbidity File, Canadian Institute for Health Information

APPENDIX C Questionnaire Content

General Demographics	Age (#1) Ethnicity/Race (#2) International student (#3) Number hours of work at paid job (#4) Year of undergraduate study (#5) GPA/High school grades (#6) People live with (#7) Living Arrangements (#8) Importance of Religion (#9) Perception of family wealth (#10) Sex of participant(#11) Sexual orientation (#12)
Health and Knowledge	Perception of overall health (#13) Peer norms about sexuality(#14) Knowledge of STIs based on Kuder-Richardson 20 test (#15) Depression using 12 item CES-Depression Scale (#16) Need for control and self-reliance (#17) Social support using Sense of Social Support Scale (#18) Perception of Emergency Contraceptives (#19)
Health Behaviours	Use of marijuana in past 30 days (#20) Binge/Heavy drinking (#21) Ever had heterosexual vaginal intercourse (#22a) Age of first vaginal intercourse(#22b) Use of condom during last vaginal intercourse (#22c) No. of people had vaginal intercourse with past 12 months(#22d) Type of contraception used during last vaginal intercourse(#22e) Ever had anal sex(#23a) Age of first anal intercourse (#23b) Use of condom during last anal intercourse (#23c) Number of people had anal sex with past 12 months (#23d) Relationship with last person had vaginal or anal sex with (#24) Unplanned vaginal/anal sexual encounter due to drug/alcohol use(#25) Perception of personal risk of becoming infected with STI (#26) Ever had an STI (#27) Ever forced to have sex (#28)
Use of University Health Services	Use of Health Centre for educational pamphlets, brochures (#29) Ever seen a doctor or nurse (#30) Frequency of visits to doctor or nurse (users only) (#31) Reason for use of health centre (users only) (#32) Continuation of health services use (users only) (#33) Level of satisfaction with sexual health services (users only) (#34) Level of satisfaction with health services staff (users only) (#35)

	Valuation of features of health service (#36) Perception of applicability of health services for students (#37) Time preference for Health centre visits (#38) Best way to tell students about Health centre (#39) Preference for sex of doctor (#40) Sexual health services sought (#41) Reason for not ever using health centre (non users only) (#42) Suggestions on improving overall services at health centre (#43) Suggestions on improving sexual health services (#44)

APPENDIX D Items of the CES-D12

During the past week:	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of the time (2-4 days)	Most or all of the time (5-6 days)
I did not feel like eating: my appetite was poor				
I felt that I could not shake the blues even with help from my family or friends				
I had trouble keeping my mind on what I was doing				
I felt depressed				
I felt like I was too tired to do things				
I felt hopeful about the future				
My sleep was restless				
I was happy				
I felt lonely				
I enjoyed life				
I had crying spells				
I felt that people disliked me				

APPENDIX E Questionnaire

SECTION A – DEMOGRAPHICS

The following questions are about you and your family. For each question please indicate your answer by checking the appropriate box or by answering on the response lines provided for some of the questions. Please note, all these questions are confidential and anonymous and you can skip any question you are not comfortable with.

1. What is your age in years? _____

2. What ethnic/racial background do you consider yourself to be? (*Check all that apply.)*

   □ White (Caucasian)

   □ African descent
   □ Aboriginal (*specify*) _____

   □ Asian

   □ Middle Eastern
   □ Other (*describe*) _____

3. Are you employed for money during the university year?

   □ No

   □ Yes (*If yes, specify how many hours you work each week*)
_____ (*hrs/wk*)

4. What year of your undergraduate program are you in?

   □ First

   □ Second

   □ Third

   □ Fourth

   □ Other (*explain*)
   _____

5. What was the last GPA you received on your University record? If you are in your first year of university, please provide the average grade of your last high school year instead.

    □ My last GPA at University was _____

    OR□ My last high school average grade was _____

6. Who do you live with?

    □ I live alone

    □ I live with one or both of my parent(s)

    □ I live with my partner (i.e., sexual or romantic partner, spouse or girlfriend/boyfriend)

    □ I live with a roommate(s) (not a sexual or romantic partner)

7. What are your living arrangements?

    □ I live off-campus

    □ I live on campus in student residence/housing

8. How important would you say religion is to you?

    □ Not important at all

    □ Not very important

    □ Fairly important

    □ Very important

9. How wealthy do you see your family as being?

    □ Very wealthy

    □ Quite wealthy

    □ Average

    □ Not so wealthy

    □ Not wealthy at all

10. What is your sex?

    - Male
    - Female
    - Transgendered
    - Other (*describe*) _____

11. People have different feelings about themselves when it comes to questions of being attracted to other people. Which of the following best describes your feelings?

    - 100% heterosexual (attracted to persons of the opposite sex)
    - Mostly heterosexual
    - Bisexual (attracted to both males and females)
    - Mostly homosexual
    - 100% homosexual (gay/lesbian, attracted to persons of the same sex)
    - Transgendered
    - Not sure

SECTION B – Your Health, Health Knowledge and Social Well Being

The next section asks questions about your health and about your knowledge of sexual health issues. It also asks how you feel about yourself and others. Please remember that all of your answers are anonymous and confidential and you can skip any question you are not comfortable with.

12. In general, would you say that your health is? (C*heck one.*)

- ☐ Excellent
- ☐ Very good
- ☐ Good
- ☐ Fair
- ☐ Poor

13. Please indicate how much you disagree or agree with the following statements by checking the appropriate number on the 5 point scale, *where 1 = "Strongly disagree" and 5 = "Strongly agree*".

	1	2	3	4	5
My friends don't think being in a relationship with one person at a time is cool	☐	☐	☐	☐	☐
My friends mostly have sex for recreation	☐	☐	☐	☐	☐
My friends believe love is not necessary for sex	☐	☐	☐	☐	☐
My friends do not believe in having sex with someone that looks respectable	☐	☐	☐	☐	☐
My friends are not in steady relationships with one person at a time	☐	☐	☐	☐	☐
Many of my friends have sex under the influence of drugs and/or alcohol	☐	☐	☐	☐	☐
My friends show little concern for sex education	☐	☐	☐	☐	☐
My friends don't know/practice safe sex	☐	☐	☐	☐	☐
My friends don't think safe sex is important	☐	☐	☐	☐	☐

14. Please indicate whether you believe each of the following statements are true or false by checking the appropriate response. If you do not know the answer, please do not guess, but answer “Don’t Know”.

	True	False	Don’t Know
If you know a person’s sexual history and lifestyle before you have sex with them, you don’t need to use condoms	□	□	□
Men with chlamydia always have symptoms	□	□	□
Women with chlamydia always have symptoms	□	□	□
Chlamydia infection in women can result in being unable to have children	□	□	□
If a guy or girl aged 18 – 24 gets chlamydia and is treated properly, he or she can never get chlamydia again	□	□	□
If both are used properly, condoms are just as effective as birth control pills in preventing pregnancy	□	□	□
Emergency contraceptive pills are available at pharmacies	□	□	□
Emergency contraceptive pills always prevent pregnancies	□	□	□
To be effective, emergency contraceptive pills must be taken within 12 hours of unprotected sex	□	□	□
Emergency contraceptive pills are more effective the earlier they are taken after unprotected sex	□	□	□
Doctors will always test for STIs when they do a PAP test	□	□	□
The time in the monthly menstrual cycle during which a female is most likely to become pregnant is about two weeks before her period begins	□	□	□

15. We would like to know how you have been feeling about yourself and your life generally. Below is a list of the ways you might have felt or behaved. Please indicate how much of the time you felt this way during the past week checking the appropriate response.

During the past week:	Rarely or none of the time (less than 1 day)	Some or a little of the time (1–2 days)	Occasionally or a moderate amount of the time (3-4 days)	Most or all of the time (5–6 days)
I did not feel like eating: my appetite was poor	□	□	□	□
I felt that I could not shake off the blues even with help from my family or friends	□	□	□	□
I had trouble keeping my mind on what I was doing	□	□	□	□
I felt depressed	□	□	□	□
I felt like I was too tired to do things	□	□	□	□
I felt hopeful about the future	□	□	□	□
My sleep was restless	□	□	□	□
I was happy	□	□	□	□
I felt lonely	□	□	□	□
I enjoyed life	□	□	□	□
I had crying spells	□	□	□	□
I felt that people disliked me	□	□	□	□

16. Please indicate how much you disagree or agree with the following statements by checking the appropriate number on the 5 point scale, where 1 = “Strongly disagree” and 5 = “Strongly agree”.

	1	2	3	4	5
I would think less of myself for needing help	□	□	□	□	□
I don’t like other people telling me what to do	□	□	□	□	□
Nobody knows more about my problems than I do	□	□	□	□	□
I’d feel better about myself knowing I didn’t need help from others	□	□	□	□	□
I don’t like feeling controlled by other people	□	□	□	□	□
It would seem weak to ask for help	□	□	□	□	□
I like to make my own decision and not be too influenced by others	□	□	□	□	□
Asking for help is like surrendering authority over my life	□	□	□	□	□

17. Please describe how true you believe each of the following statements about your social relationships and support networks, where 1 = not at all true and 5 = completely true

	1	2	3	4	5
I participate in volunteer/service projects	□	□	□	□	□
I have meaningful conversations with my parents and or/siblings	□	□	□	□	□
I have a mentor(s) in my life I can go to for support/advice	□	□	□	□	□
I seldom invite others to join me in my social and or/recreational activities	□	□	□	□	□
There is at least one person I feel a strong emotional tie with	□	□	□	□	□
There is no one I can trust to help solve my problems	□	□	□	□	□
I take time to visit my neighbours	□	□	□	□	□
If a crisis arose in my life, I would have the support I need from family and/or friends	□	□	□	□	□
I belong to a club (e.g., sports, hobbies, support group, special interests)	□	□	□	□	□
I have friends from work that I see socially (movie, dinner, sports etc)	□	□	□	□	□
I have friendships that are mutually fulfilling	□	□	□	□	□
There is no one I can talk to when making important decisions in my life	□	□	□	□	□
I make an effort to keep in touch with friends	□	□	□	□	□
My friends and family feel comfortable asking me for help	□	□	□	□	□
I find it difficult to make new friends	□	□	□	□	□
I look for opportunities to help and support others	□	□	□	□	□
I have a close friend(s) who I feel comfortable sharing deeply about myself	□	□	□	□	□
I seldom get invited to do things with others	□	□	□	□	□
I feel well supported by my friends and/or family	□	□	□	□	□
I wish I had more people in my life that enjoy the same interests and activities as I do	□	□	□	□	□
There is no one that shares my beliefs and attitudes	□	□	□	□	□

18. The following are some statements about Emergency Contraception (EC). Please rate whether you agree or disagree with the statements, where 1 = “I completely disagree” and 5= “I completely agree”.

	1	2	3	4	5
My partner or I could get EC if we needed it	□	□	□	□	□
I could get EC at my university health centre if I wanted to get	□	□	□	□	□
I would prefer to go to a pharmacy to obtain EC pills if I or my	□	□	□	□	□

SECTION C – HEALTH BEHAVIOURS

The next section asks questions about sexual activity and other health behaviours, and your opinions and feelings about sexuality issues. Please remember that all of your answers are anonymous and confidential and you have the right to skip any question you are not comfortable with.

19. During the past 30 days, how many times did you use marijuana?

- 0 times
- 1 or 2 times
- 3 to 9 times
- 10 to 19 times
- 20 to 39 times
- 40 or more times

20. During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?

- 0 days
- 1 day
- 2 days
- 3 to 5 days
- 6 to 9 days
- 10 to 19 days
- 20 or more days

The following questions; Q.s21 (a-e) and 22 (a-d) pertain to heterosexual vaginal intercourse and anal sex (male to male or male to female).

21. Read the following definition of heterosexual vaginal intercourse and then answer the question below. "Heterosexual vaginal intercourse occurs when a male's penis enters a female's vagina. When this happens, both people are having vaginal intercourse."

Have you **ever** had heterosexual vaginal intercourse? (*Check one.*)

- □ I prefer not to answer *[Skip to Question 26(a)]*
- □ No *[Skip to Question 26(a)]*
- □ Yes

22. How old were you **the last time** you had heterosexual vaginal intercourse?
_____ (*Specify your age in years.*)

23. Did you or your partner use a condom the last time you had heterosexual vaginal intercourse?

- □ No
- □ Yes

24. In the **past 12 months**, with how many people have you had heterosexual vaginal intercourse? _____ person/people (*Please fill in number.*)

25. Which of the following forms of contraception did you and/or your partner use the last time you had heterosexual vaginal intercourse? *(Check all the boxes that apply.)*?

- □ Oral contraception (the pill)
- □ Intrauterine device (IUD)
- □ Depo-Provera (the needle)
- □ Contraceptive patch
- □ Condom
- □ Withdrawal
- □ Don't know/Can't remember
- □ Other (specify) _____
- □ No contraception was used

26. Please read the following definition of anal sex and then answer the question below. "Anal sex occurs when a male's penis enters another person's (male or female) anus or rectum (their behind). When this happens, both people are having anal sex."

Have you ever had anal sex? (*Check one.*)

- □ I prefer not to answer (*Skip to Question 27)*
- □ No (*Skip to Question 27*)
- □ Yes

27. How old were you **the first time** you had anal sex?

28. Did you use a condom the last time you had anal sex?

□ No

□ Yes

29. In the **past 12 months**, how many people have you had anal sex with?

_____ person/people (*Please fill in number.*)

30. Do you or did you have a steady relationship with the last person you had vaginal or anal sex with?

□ No

□ Yes (S*pecify length of your relationship)* _____*(years)* _____*(months)*

31. In the **past 12 months** have you had a sexual encounter; either vaginal or anal, when you did not plan to because you were under the influence of alcohol or drugs?

□ Yes

□ No

If yes, please specify:

□ Alcohol

□ Drugs

□ Both

32. Have you ever had a sexually transmitted infection (STI) which was diagnosed by a health professional?

□ No

□ Yes (*Specify which STI(s)*)_____

33. With your present sexual lifestyle, how much at risk do you personally feel of becoming infected with a sexually transmitted infection (STI)? *(Check one box only.)*

□ Greatly at risk

□ Quite a lot at risk

□ Not very much at risk

□ Not at all at risk

34. Since you have been at university, have you ever been forced to have sex of any type against your will?

□ No

□ Yes

SECTION D– Use of Health Care Services

This section asks about the health care services provided by your university health centre, both in general and concerning your use of sexual health services. Please remember that all of your answers are anonymous and confidential. You have the right to refuse to answer any of these questions.

35. Have you visited your student health centre in the past 12 months to pick up written material such as pamphlets or brochures about sexual health concerns or other health related issues?

□ No

□ Yes

36. Have you ever seen a doctor or a nurse at your university health centre for any reason?

□ No *(Skip to Question 42.)*

□ Yes

(R*eason for last visit*) _____

37. In the past 12 months, about how often did you see your doctor or nurse at your university health centre? If this is your first year at university, please indicate how often you have seen your doctor or nurse at your university health centre since you first arrived.

□ More than once per month

□ About once per month

□ Less than once per month

38. Please indicate if any of the following is a reason for your using your university health centre (*Check all that apply*)

□ I am more comfortable at my university health centre than I am with my family doctor

□ The staff at my university health centre are friendly and approachable

□ It's confidential – the reason for my visit will be kept secret from other people

 The university health centre provides the information that I need in a way that I can understand

 The university health centre is convenient to use because it is on campus

 I don't get judged for going there.

 It's the only option I have available when I have a concern

39. Have you continued to use your university health centre since your first visit?

 No

 Yes ⟶ If "Yes" go to the next Question

If "No" why have you not continued to use your university health centre? (Check all that apply.)

 I felt that I was judged by the nurse/doctor during my last visit

 I did not find it easy to discuss my needs or concerns with the doctor/nurse

 The hours and location are inconvenient

 There was no reason for me to go to my university health centre more than once

 Other (*specify)* _____

40. Please rate your level of satisfaction with the sexual health service(s) you have received at your university health centre by checking the appropriate number on the 5 point scale, where 1 = "not at all satisfied" and 5 = "very satisfied". Please check N/A (not applicable) if you have never accessed such services.

Type of service	1	2	3	4	5	N/A
Counselling about use of condoms	□	□	□	□	□	□
Counselling about sexually transmitted infections	□	□	□	□	□	□
Testing for sexually transmitted infections	□	□	□	□	□	□
Counselling about violence/abuse in relationships	□	□	□	□	□	□
Discussing issues related to sexual orientation	□	□	□	□	□	□
Discussing other sexual health issues	□	□	□	□	□	□
Pregnancy testing	□	□	□	□	□	□
Provision of educational pamphlets and brochures about sexual health	□	□	□	□	□	□
Referral to another health care provider about sexual health	□	□	□	□	□	□
Provision of emergency contraception	□	□	□	□	□	□
Counselling about or prescription for birth control	□	□	□	□	□	□
Pap testing	□	□	□	□	□	□

41. Please rate the following characteristics of your university health centre staff with respect to any sexual health services you have received from them (counselling about relationships, preventing sexually transmitted infections, etc.), where 1 = "poor service " and 5 = "excellent service". If you have not received any sexual health services, or the question does not apply to your experiences, please check N/A (not applicable).

Characteristics of care:	1	2	3	4	5	NA
They are not judgmental about my sexual activity	□	□	□	□	□	□
They take time to explain things about sexual health	□	□	□	□	□	□
They address the sexual health issues for which I come to the health service very well	□	□	□	□	□	□
They let me stay in control of available options during visits about sexual health	□	□	□	□	□	□
The same person sees me on every visit that I have about sexual health	□	□	□	□	□	□

THE FOLLOWING QUESTIONS ARE FOR <u>EVERYONE</u> - BOTH THOSE WHO HAVE USED THEIR UNIVERSITY HEALTH SERVICES AND THOSE WHO HAVE NOT USED THEM

42. How important would you say the following features of a university health centre are in general, where 1 = “not at all important” and 5 = “extremely important”?

Features	1	2	3	4	5
The range of services available	□	□	□	□	□
The atmosphere of the waiting area	□	□	□	□	□
The privacy of the reception area	□	□	□	□	□
The friendliness of the people working there	□	□	□	□	□
Confidentiality about students’ health information is assured	□	□	□	□	□
Hours of operation	□	□	□	□	□
Transportation to the university health centre	□	□	□	□	□
Length of time you have to wait to be seen	□	□	□	□	□
The location of the university health centre	□	□	□	□	□

43. How applicable to students’ needs would you say the following services, which can be provided by a university health centre, are where 1 = “not applicable to students’ health needs” and 5 = “very applicable to students’ health needs”.

Type of service	1	2	3	4	5
Counselling about birth control and/or free condoms	□	□	□	□	□
Counselling about having sex for the first time	□	□	□	□	□
Counselling about sexually transmitted infections	□	□	□	□	□
Counselling about HIV/AIDS	□	□	□	□	□
Discussing issues related to my sexual orientation	□	□	□	□	□
Counselling about other sexual health issues	□	□	□	□	□
Counselling about other worries to do with sex and sexuality	□	□	□	□	□
Pregnancy testing	□	□	□	□	□
Emergency contraception (sometimes called the morning after	□	□	□	□	□
Educational pamphlets and brochures about sexual health	□	□	□	□	□
Referral to another health care provider about sexual health	□	□	□	□	□

The following questions concern your preferences for accessing sexual health services at your university health centre

44. When would it be convenient for you to visit your university health centre? (*Check all that apply.*)

    - ☐ In the morning before classes
    - ☐ Lunchtime
    - ☐ Afternoon
    - ☐ Evenings
    - ☐ Saturday

45. What do you think would be the <u>best</u> way for us to tell students about the university health centre? (*Check only one*)

    - ☐ University admission letter
    - ☐ Visit to the clinic during student orientation
    - ☐ Visit to first year classes by health centre staff
    - ☐ Posters on student information boards
    - ☐ Leaflets around campus
    - ☐ Internet (e.g. a web site, email newsletters, etc.)
    - ☐ Other (*specify*)

      _____

46. If you had a choice of the sex of the doctor/nurse that you see at your university health centre which would you choose? (*Check only one*)

    - ☐ I would like to be seen by a female doctor/nurse
    - ☐ I would like to be seen by a male doctor/nurse
    - ☐ It's not important

47. Have you ever seen a health professional in order to obtain the following services? If you answer 'Yes' for a particular service, please indicate the location where you access that service.

Service:	Accessed?		If yes, please indicate location	
	Yes	No	University health centre	Other
STI testing	☐	☐	☐	☐
PAP testing	☐	☐	☐	☐
HIV/AIDS testing	☐	☐	☐	☐
Pregnancy testing	☐	☐	☐	☐

48. If you have never been to your university health centre please indicate below why you did not go. (*Check all that apply.*)

☐ I haven't had any health concerns

☐ I don't think a nurse/doctor can help me with my concerns

☐ I don't think a nurse/doctor will understand gay, lesbian or bisexual issues

☐ The university health centre was not open when I wanted to use it

☐ I don't trust the university health centre to keep my health information confidential

☐ I went elsewhere with my health concerns over the past year (If so, please indicate where)

_____

☐ Other reasons (*specify*)

_____

49. Do you have any suggestions on how to improve the overall health services provided at the university health centre?

_____

_____

50. Do you have any suggestions on how to improve the sexual health services and or information provided at the university health centre?

51. How did you find out about this study? (Check all that apply)

- Email
- Facebook/Twitter
- University news (e.g. newsletter, web page, etc.)
- Poster
- Student told me
- Professor told me
- Other (specify) _____

Thank you for participating in our survey. This information will be used to help improve student health services.

Dalhousie Only Questions:

(DAL_Student_Type) Are you a full time or a part time student?

- Full time
- Part time

(DAL_Previous_Degree) Do you have a previous degree?

- Yes
- No

(DAL_Faculty) What Faculty are you in?

- Faculty of Agriculture
- Faculty of Architecture and Planning
- Faculty of Arts and Social Sciences
- Faculty of Computer Sciences
- Faculty of Engineering
- Faculty of Health Professions
- Interdisciplinary/Multi-Faculty
- Faculty of Management
- Faculty of Science
- School of Journalism
- Faculty of Dentistry

UNB Only Questions:

(UNB_Undergrad) I am a UNB undergraduate student

- Yes
- No

(UNB_Consent) I agree to participate

- Yes
- No

APPENDIX F Imputed Variables and Missing Data

Variable Label	Question Text/Description	Percent Missing
Q1_Age	What is your age in years?	0%
Q5_University_GPA_Standard	Derived variable calculated from the cleaned version of "Q5_University_GPA". Each of the universities grading systems were interpreted and standardized into this numeric average.	0%
Q5_High_School_Average	What was the last GPA you received on your University record? If you are in your first year of university, please provide the average grade of your last high school year instead. Average high school grade.	0%
Q3_Employed	Are you employed for money during the university year?	0.24%
Q3_Employed_hrs	Yes (If yes, specify how many hours you work each week - hrs/wk)	0%
Q4_Student_Year	What year of your undergraduate program are you in?	0.32%
Q8_Religion	How important would you say religion is to you?	0.17%
Q9_Wealth	How wealthy do you see your family as being?	0.19%
Q10_Sex	What is your sex?	0%
Q12_General_Health	In general, would you say that your health is? (check one.)	0.43%
Q13_Peer_SH_Attitudes1	My friends don't think being in a relationship with one person at a time is cool	0.29%
Q13_Peer_SH_Attitudes2	My friends mostly have sex for recreation	0.37%
Q13_Peer_SH_Attitudes3	My friends believe love is not necessary for sex	0.58%
Q13_Peer_SH_Attitudes4	My friends do not believe in having sex with someone that looks respectable	1.08%
Q13_Peer_SH_Attitudes5	My friends are not in steady relationships with one person at	0.54%

	a time	
Q13_Peer_SH_Attitudes6	Many of my friends have sex under the influence of drugs and/or alcohol	0.55%
Q13_Peer_SH_Attitudes7	My friends show little concern for sex education	0.57%
Q13_Peer_SH_Attitudes8	My friends don't know/practice safe sex	0.54%
Q13_Peer_SH_Attitudes9	My friends don't think safe sex is important	0.60%
Q15_Depression1	I did not feel like eating my appetite was poor	0.53%
Q15_Depression2	I felt that I could not shake off the blues even with help from my family or friends	0.72%
Q15_Depression3	I had trouble keeping my mind on what I was doing	0.64%
Q15_Depression4	I felt depressed	0.69%
Q15_Depression5	I felt like I was too tired to do things	0.69%
Q15_Depression6	I felt hopeful about the future	0.74%
Q15_Depression7	My sleep was restless	0.66%
Q15_Depression8	I was happy	0.63%
Q15_Depression9	I felt lonely	0.67%
Q15_Depression10	I enjoyed life	0.81%
Q15_Depression11	I had crying spells	0.76%
Q15_Depression12	I felt that people disliked me	0.59%
Q16_Barrier1	I would think less of myself for needing help	0.54%
Q16_Barrier2	I don't like other people telling me what to do	0.50%
Q16_Barrier3	Nobody knows more about my problems than I do	0.61%
Q16_Barrier4	I'd feel better about myself knowing I didn't need help from others	0.61%
Q16_Barrier5	I don't like feeling controlled by other people	0.69%
Q16_Barrier6	It would seem weak to ask for help	0.69%
Q16_Barrier7	I like to make my own decision and not be too influenced by others	0.85%
Q16_Barrier8	Asking for help is like surrendering authority over my life	0.61%

Q17_Social_Support1	I participate in volunteer/service projects	0.81%
Q17_Social_Support2	I have meaningful conversations with my parents and or/siblings	0.83%
Q17_Social_Support3	I have a mentor(s) in my life I can go to for support/advice	1.03%
Q17_Social_Support4	I seldom invite others to join me in my social and or/recreational activities	
Q17_Social_Support5	There is at least one person I feel a strong emotional tie with	1.01%
Q17_Social_Support6	There is no one I can trust to help solve my problems	1.02%
Q17_Social_Support7	I take time to visit my neighbours	1.11%
Q17_Social_Support8	If a crisis arose in my life, I would have the support I need from family and/or friends	0.94%
Q17_Social_Support9	I belong to a club (e.g., sports, hobbies, support group, special interests)	0.96%
Q17_Social_Support10	I have friends from work that I see socially (movie, dinner, sports etc)	1.22%
Q17_Social_Support11	I have friendships that are mutually fulfilling	1.11%
Q17_Social_Support12	There is no one I can talk to when making important decisions in my life	0.97%
Q17_Social_Support13	I make an effort to keep in touch with friends	1.03%
Q17_Social_Support14	My friends and family feel comfortable asking me for help	1.12%
Q17_Social_Support15	I find it difficult to make new friends	0.93%
Q17_Social_Support16	I look for opportunities to help and support others	1.13%
Q17_Social_Support17	I have a close friend(s) who I feel comfortable sharing deeply about myself	1.07%
Q17_Social_Support18	I seldom get invited to do things with others	1.06%
Q17_Social_Support19	I feel well supported by my friends and/or family	1.24%
Q17_Social_Support20	I wish I had more people in my	1.13%

	life that enjoy the same interests and activities as I do	
Q17_Social_Support21	There is no one that shares my beliefs and attitudes	1.02%
Q18_EC_1	My partner or I could get EC if we needed it	2.08%
Q18_EC_2	I could get EC at my university health centre if I wanted to get it there	2.57%
Q18_EC_3	I would prefer to go to a pharmacy to obtain EC pills if I or my partner needed it	2.19%