

FACTORS THAT INFLUENCE HEALTH BEHAVIORS AMONG
MIDDLE EASTERN COLLEGE WOMEN IN THE UNITED STATES

by

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ABSTRACT OF THE DISSERTATION

Factors that influence health behaviors among Middle Eastern College Women in the
United States

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Dr. Rula Btoush

Study Purpose: We know there are problematic health behaviors among college students. College students are faced with adjustments in academic workload, social pressures, anxiety, and changes in supportive networks. It is also known that in the United States, problematic health behaviors exist among immigrant populations. Therefore, health behaviors among immigrant college students may also be impacted by social exclusion, socioeconomic status, and access to health care services. Studies report health behaviors among college students in American colleges; however, we know very little about Middle Eastern college students in the United States. Despite Middle Eastern population growth in the US, little is known about the Middle Eastern community; more specifically, little is known about Middle Eastern college women in the United States. Therefore, the purpose of this study was to examine the rates and correlates of health behaviors among Middle Eastern college women in the United States.

Methodology: This descriptive correlational study examined the rates and correlates of health behaviors among Middle Eastern college women in the United States.

Analysis: Statistical analysis tested the hypothesis and built predictive models of factors associated with health behaviors among the study sample. The analysis proceeded in three stages. The first stage consisted of descriptive (univariate) analysis. The second

stage consisted of bivariate analysis. Chi-square was used to examine the effect of the categorical predictors on health behaviors. The t-test was used to examine the effect of continuous predictors on health behaviors. The third stage consisted of hierarchical multivariate regression analysis, which built models of the predictors.

Results: Four hundred and six Middle Eastern college women participated in the study. Findings address factors that influence health behaviors in this population, including individual, sociocultural, and access to care.

Conclusion: Policy implications for program interventions were identified to address risky health behaviors. The benefits derived from the study findings have provided us with implications for policy, practice, and future research. The study design, integrative theoretical model, and findings contribute to the current literature, which is lacking in data related to factors that influence health behaviors among this population.

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Dedications

This Dissertation, a decade of work, is dedicated to my husband Walter, for his unwavering support and selfless sacrifices. Your love and patience has allowed me to achieve this monumental goal. I have been a student from baccalaureate to doctoral for 21 out of our 39 years of marriage! To my adult children, Daniel and Christina, my greatest cheerleaders! Tenacity and focus drove me to the finish line! Finally, to my Dad, who said to me, May 1998, the day I graduated from my Masters Program, "so when are you going for your doctorate". My tenacity and focus are a tribute to you, Anthony Miserendino (1920-2001).

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CHAPTER ONE

PROBLEM STATEMENT

We do know that there are problematic health behaviors among college students in the United States (US). College students are faced with adjustments in academic workload, social pressures, anxiety, and changes in supportive networks. It is also known that in the US, problematic health behaviors exist among immigrant populations. Therefore, health behaviors among immigrant college students may be also be impacted by social exclusion, socioeconomic status, and access to health care services.

In the US, despite several decades of health warnings about the risks associated with cigarette smoking and the declining social acceptability of tobacco use, cigarette smoking among young adults remains a health concern. A study by Everett (1999) reported that in a nationally representative sample of undergraduate college students in the US, 29% were self-reported cigarette smokers (Everett et al., 1999). A study done in 2000 reported, among 1,350 college students who participated in the study, 41.3% had smoked in the past year and 28.2% had smoked in the past 30 days. Daily use of cigarettes in the past 30 days was reported by 17.8% of students, whereas 10.1% stated that they had smoked at least half a pack of cigarettes in the past 30 days (Patterson, Lerman, Kauman, Neuner, & Audrain-McGovern, 2010).

Despite college attendance, there are a number of factors that put college-age women at risk for developing Human Papilloma Virus (HPV) and undetected cervical cancer (Alexander et al., 2014). These include contraceptive needs, number of lifetime sexual partners and ambivalence toward HPV vaccination and cervical cancer screening. The prevalence of sexually transmitted diseases suggests an increased risk among young

adults, particularly sexually active college students. Approximately 12.6 million new cases of sexually transmitted infections (STIs) are diagnosed each year, excluding HIV, in young adults under the age of twenty-five (Centers for Disease Control and Prevention, 2012; Control & Prevention, 2012).

College freshman may be more vulnerable to changes in weight because of changes in lifestyle and increased stress. Studies conducted in American universities have found that students' diets consist of foods high in fats, low in fruits and vegetables, and participation in physical activity is inadequate (Debate, Topping, & Sargent, 2001; Silliman, Rodas-Fortier, & Neyman, 2004).

College students are at risk for dating violence as a result of newly found autonomy from parental authority, inexperienced sexual intimacy, and limited relationship skills. A study of college-aged women found that 35% reported at least one instance of partner violence victimization during college (Fass, Benson, & Leggett, 2008). The adverse health outcomes of violence included poorer health status, poorer quality of life, and an increased utilization of healthcare services. In addition to physical injuries such as bruising, lacerations, and bone fractures, specific health complaints that may occur as a result of violence, included pelvic pain, vaginal infections, gastrointestinal symptoms, headaches, and mental health conditions such as depression and anxiety (Black, Basile, Breiding, Smith, & Walters, 2011). Researchers have reported high rates of partner violence among women attending college with incidences ranging from 26% to 36%. Partner violence among college women has often been referred to as dating violence and has included elements of power, control, and aggression within the relationship (Elmquist et al., 2016).

Despite numerous studies that reported health behaviors among college students in American universities, we know very little about Middle Eastern university students in the US. Middle Easterners are one of the fastest growing immigrant groups in America, from fewer than 200,000 in 1970 to nearly 1.5 million in the year 2000 (Camarota, 2002). Figure 1 is a map of the Middle East. Middle Easterners from the Arabic speaking countries are from Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syria, United American Emirates, and Yemen (Arab American Institute, 2009-2015).

Immigrants from non-Arabic countries are from Iran, Israel, and Turkey. Middle Easterners from the North African countries have immigrated from Libya, Tunisia, and Morocco (Arab American Institute, 2009-2015). The population of Middle Easterners with Arab ancestry in New Jersey is 85,956. It is estimated that the statewide population, adjusting for under-reporting, is closer to 257,868 (Arab American Institute, 2009-2015). The majority of Middle Easterners that reside in New Jersey are from Arabic speaking Middle Eastern countries (Arab American Institute, 2009-2015).

Figure 1

The Middle East (Environmental Systems Research Institute, 1999)



Middle Easterners from Arabic countries share conservative views and similar linguistics. Those from non-Arabic Middle Eastern countries e.g. Israel and Turkey live in more liberal societies. Iran is a wide blend of conservative and liberal groups, whom have liberal views in the US. Additionally, women from North African countries (i.e., Libya, Tunisia, and Morocco) represent a very small portion of Middle Eastern

Arabs in New Jersey (Arab American Institute, 2009-2015). Immigration from these countries has decreased compared to the nineteen seventies and nineteen eighties. Middle Easterners with Arabic background, is a diverse population in regards to religion and self-identify as Christian, Muslim, or other.

Despite the Middle Eastern population growth in the US and in New Jersey, little is known about the Middle Eastern community; more specifically little is known about Middle Eastern college women in the US. Therefore, the purpose of this study is to

examine the rates and correlates of health behaviors among Middle Eastern college women in the US. This study will answer the following research questions:

1. What is the prevalence of health behaviors (*smoking, cervical cancer screening, age appropriate immunizations, sexual behaviors, nutrition, physical activity, and experiences of unwanted sexual contact and injury*) among Middle Eastern college women in the United States?
2. Is there an association between health behaviors and *demographic characteristics* (e.g., age, marital status, immigration generation status, religious affiliation, etc.) among Middle Eastern college women in the United States?
3. Is there an association between health behaviors and *sociocultural factors* (e.g. social support, perceived discrimination, religiosity, acculturation, and patriarchal beliefs) among Middle Eastern college women in the United States?
4. Is there an association between health behaviors and *access to services* (e.g. having a healthcare provider, health insurance, and access to health information) among Middle Eastern college women in the United States?

Middle Eastern cultural, religious, and structural factors can have a profound effect on health behaviors. Barriers to health behaviors including modesty, gender concordance of healthcare provider, misconceptions of illness causation, and religiosity arise from those specific cultural beliefs and practices among this population (Yosef, 2008).

This study will focus on college women from Middle Eastern Arabic countries, including Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syria, United American Emirates, and Yemen. Women from non-

Arabic Middle Eastern countries (i.e., Iran, Israel, and Turkey) were not included because of diverse traditions and languages that required research to focus solely on them. Additionally, women from North African countries (i.e., Libya, Tunisia, and Morocco) were excluded from the study because they represented a very small portion of Middle Eastern Arabs in New Jersey (Arab American Institute, 2009-2015)

CHAPTER TWO

LITERATURE REVIEW

Health Behaviors

Health-related behaviors are major determinants of the population distribution of health and disease (Stringhini et al., 2011). Healthy People 2020, the federal document that outlines science-based, national goals, and objectives with 10-year targets, promotes disease prevention efforts to improve the health of all people in the US (Talih & Huang, 2016). Risky health behaviors i.e., smoking, poor diet, alcohol and drug abuse, physical inactivity, failure to immunize, sexual behaviors, and lack of screenings for cardiovascular diseases and cancer may result in the development of debilitating chronic diseases. Chronic diseases result in loss of independence, risk for other morbidities, mortality, or death, and impose a considerable economic burden on societies in the US and around the world.

This chapter discusses health behaviors related to smoking, cervical cancer screening, age appropriate immunizations, sexual behaviors, nutrition, physical activity, and experiences of unwanted sexual contact and physical injury in college women. Alcohol and drug use/abuse will not be addressed in this study. Arabic countries are influenced by religious proscription and social discouragement toward alcohol and substance use (Arfken, Ahmed, & Abu-Ras, 2013; Arfken, Arnetz, Fakhouri, Ventimiglia, & Jamil, 2011). Alcohol use is extremely low in Middle Eastern women, whereby alcohol use brings shame to the family. In the context of Muslim-Arab tradition, alcohol and drug use and abuse is regarded as taboo (Kjiri, Boulayoun, Rammouz, Cherkaoui, & Ktiouet, 2005).

Smoking (Cigarettes/Hookah)

Cigarette smoking is among the key determinants of health, which influences the risk for morbidity and mortality rates of cancers and cardiovascular and lung diseases. Tobacco consumption is linked to health risks that affect women, which include diseases of the respiratory, cardiovascular, gastrointestinal, and the reproductive system. Specific reproductive system disorders include cancer, miscarriages, premature deliveries, low birth weight for infants, and sudden death syndrome in newborns (WHO, 2010).

According to the World Health Organization (WHO), 200 million women are consumers of tobacco among the one billion smokers worldwide. It is predicted that by the year 2025, the number of female smokers will increase to more than 500 million women worldwide. The vast global increase in the number of women smokers will have significant consequences on health and unborn children (WHO, 2001). Middle Eastern countries reported the prevalence of cigarette smoking among women (12%) to be much lower than among men (48%) (Haddad & Malak, 2002). Middle Eastern women are stigmatized for tobacco use, which contributes to their restricted use in public spaces. In the context of family, smoking is forbidden among daughters (Sarrafzadegan et al., 2010). The male perception of female cigarette smokers is less attractive compared to female non-smokers (Maziak et al., 2004).

Among studies that have examined cigarette smoking in Middle Eastern women, few have explored cigarette smoking in Middle Eastern college women. These studies have found that the prevalence of cigarette smoking is higher among Middle Eastern college men than women. Among Iranian young men and women, ages 19 years and above, 18.7% of males and 1.3% of females reported smoking (Sarraf-Zadegan et al.,

2004). Among Saudi Arabian university students, 32.7% males versus 5.9% females were smokers (Mandil et al., 2010). Smoking is restricted for women by social norms, conservative behavior, and traditions (Haddad & Malak, 2002; Mandil et al., 2010; Maziak et al., 2004; Sarraf-Zadegan et al., 2004; Sarrafzadegan et al., 2010).

Although cigarette smoking is the most common form of tobacco consumption, globally hookah smoking has become increasingly popular. The World Health Organization reports one single hookah smoking session is equivalent to 100 times the smoke volume and 40 times the tar of a single cigarette (Cobb, Shihadeh, Weaver, & Eissenberg, 2011; Shihadeh & Saleh, 2005; WHO, 2005). Hookah smoking, originated in the Mediterranean and Middle Eastern regions, is defined as the passage of tobacco smoke through water vapor prior to inhalation (Braun, Glassman, Wohlwend, Whewell, & Reindl, 2012).

The hookah is also referred to as a water pipe for tobacco, gouza, narghile, hubble-bubble, shisha, and ghalyan. Perceived positive attributes of hookah smoking are its pleasant fragrance and taste in comparison to cigarettes, and it is regarded as non-addictive. Negative attributes are the exposure to inhaled carbon monoxide, nicotine, and tar, in addition to transmission of infectious diseases from shared mouthpieces (Sarrafzadegan et al., 2010). A single hookah session lasts between 30 - 60 minutes (Braun et al., 2012).

Several studies have examined hookah smoking in Middle Eastern women. Among these studies, only a few have examined hookah smoking in Middle Eastern college women. Similar to cigarette smoking, the prevalence of hookah smoking is higher among Middle Eastern men than women (Mandil et al., 2010; Nuzzo et al., 2013;

Rahman, Chang, Hadgu, Salinas-Miranda, & Corvin, 2014). However, hookah smoking, under certain conditions, is more acceptable than cigarette smoking among Middle Eastern men and women. Less social stigma is associated with hookah smoking compared to cigarette smoking among Middle Eastern men and women (Afifi et al., 2013; Baheiraei, Sigaldeh, & Majdzadeh, 2015; Jamil, Geeso, Arnetz, & Arnetz, 2014; Khalil et al., 2013; Mandil et al., 2010; Maziak et al., 2004; Sarrafzadegan et al., 2010; WHO, 2005).

Among Middle Easterners, hookah smoking in the presence of family, in private spaces, and when accompanied by husbands is reported to be more socially acceptable (Afifi et al., 2013; Baheiraei, Sigaldeh, Ebadi, Kelishadi, & Majdzadeh, 2015; Baheiraei, Sigaldeh, & Majdzadeh, 2015; Khalil et al., 2013). Single Middle Eastern women are perceived to engage in hookah smoking as attention-seeking behavior and as an opportunity to challenge traditional gender norms (Afifi et al., 2013; Baheiraei, Sigaldeh, & Majdzadeh, 2015; Khalil et al., 2013; Maziak et al., 2004).

Hookah smoking has gained appeal in the US. Hookah smoking is perceived to be less lethal than cigarette smoking (Nuzzo et al., 2013). The National College Health Assessment II data indicated 25% of college students in the US have ever smoked hookah (Braun et al., 2012). Among studies that have examined hookah smoking among college students in the US, hookah smoking is associated with high-risk behaviors, similar to alcohol and marijuana use. Optimistic bias exists, whereby, hookah smokers view hookah smoking as less harmful and less addictive than cigarette smoking (Braun et al., 2012; Nuzzo et al., 2013; Rahman et al., 2014). Rahman and colleagues (2014) also found that more male students reported hookah smoking than female students, 22.2%

male versus 11.5% female. They also reported that students of Middle Eastern descent had the highest prevalence of hookah use, followed by White, Asian, Hispanic, and African Americans. However, this study did not report the prevalence specifically among women of Middle Eastern descent (Rahman et al., 2014).

In summary, studies have shown that cigarette and hookah smoking in the Middle East is more common among males. This includes studies that occurred in both Middle Eastern and US college/university settings. However, studies are lacking on Middle Eastern college women, particularly in the US. Further, a major limitation in previous studies of Middle Eastern college women are the reliance upon self-reporting and recall bias. Self-reporting may not be accurate due to under-reporting of responses associated with social stigma (Sarraf-Zadegan et al., 2004).

Cervical Cancer Screening

The risk of developing cervical cancer is associated with early age of vaginal intercourse, multiple sexual partners, smoking, and infection with human papilloma virus (Society, 1990). Cervical cancer mainly affects young women. By 2020, it is estimated that cervical cancer rates will affect 0.7 million women, in the absence of prevention or decreased risk factors (Ilter et al., 2010). Cervical cancer is preventable and treatable. The Papanicolaou (Pap) smear is an efficient, affordable, and effective screening method for detecting early changes in the cervical mucosa. Routine screening detects early cytological changes (Maaita & Barakat, 2002). Cervical cancer screening is influenced by socioeconomic factors, race, ethnicity, immigrant status, and religious identity. Immigrants to the US have lower rates of Pap screening than their US-born counterparts (Padela, Peek, Johnson-Agbakwu, Hosseinian, & Curlin, 2014).

Studies that examined cervical cancer screening in Middle Eastern women reported 75-95% of women have never had a Pap screening. The predictors of never having had a Pap smear were reported as fear, embarrassment, and unnecessary (Amarin, Badria, & Obeidat, 2008; Bener, Denic, & Alwash, 2001; Durvasula, Regan, Ureno, & Howell, 2006; Maaita & Barakat, 2002). Amarin and Bener excluded single Middle Eastern women in their studies (Amarin et al., 2008; Bener et al., 2001). Sexual activity and multiple partners predispose women to cervical cancer. Traditional Middle Eastern beliefs proclaim that women remain virgins prior to marriage, therefore, minimizing their risk for cervical cancer, thus believing that cervical cancer screening in single Middle Eastern women is unnecessary. However, there are other factors that place women at risk for cervical cancer risks i.e. genetic tendency, smoking, and engagement in premarital sexual encounters (Alberto Fonseca-Moutinho, 2011). Stigma associated with cervical exams in unmarried Middle Eastern women also contributes to the disparity in screening. Traditional cultural and religious factors that reflect values of virginity and modesty have been identified as barriers to screening and diagnosis (Chesun, Harncharoen, Taechaboonsersak, & Siri, 2012; Matin & LeBaron, 2008).

Among studies that examined Southeast Asian and Middle Eastern college student's knowledge and perceptions of cervical cancer screening, it was reported that, "even highly educated women knew very little about cervical cancer and cervical cancer screening" (Dhendup & Tshering, 2014; Haseeb Hwaid, 2013; Wong & Sam, 2010). Studies are lacking on knowledge, perception, and participation of cervical cancer screening among Middle Eastern college women in the US.

In summary, Middle Eastern studies that have examined cervical cancer screening in Middle Eastern women report poor participation. Studies that have examined Middle Eastern and Southeast Asian college women's knowledge and participation in cervical cancer screening, reported low levels of knowledge and participation. A major limitation to previous studies is the lack of reported information on cervical cancer screening among unmarried Middle Eastern women, particularly in US college settings (Amarin et al., 2008; Bener et al., 2001; Haseeb Hwaid, 2013). In addition, reliance on self-report may be impacted by social desirability that results in over-reporting knowledge and participation in cervical cancer screening.

Immunizations (age-appropriate)

This section of the literature review addresses three age-appropriate immunizations for college women. These immunizations are HPV, meningitis, and influenza vaccinations.

HPV Vaccine. HPV is the most common sexually transmitted infection in the US. The HPV infection prevalence is highest among young women within the first few years after onset of vaginal intercourse. High-risk HPV types are detected in 99% of cervical cancers (Bosch & de Sanjose, 2003; Control, 2012). Although HPV infections remain prevalent across the lifespan, the prevalence peaks among young adults, which includes college-aged students (Dunne et al., 2007). The HPV vaccine (Gardasil, Merck and Cervarix, GlaxoSmithKline) is recommended for women aged 9-26 years of age. Both vaccines consist of three injections administered over a six-month period (Licht et al., 2010). The vaccine is ideally administered to 9-12 year-old girls; however, unvaccinated

college -aged women are at high risk due to high rates of sexual activity (Daley et al., 2010).

Several studies have examined HPV vaccination in college-aged women in the US and have found that 50% of this population reported having received the HPV vaccine (Daley et al., 2010; Dunne et al., 2007; Lefkowitz, Kelly, Vasilenko, & Maggs, 2014; Licht et al., 2010; Manhart et al., 2011; Marchand, Glenn, & Bastani, 2013). Among these study results, receipt of the HPV vaccine, included those college women who did not complete the series of three vaccines for lifetime protection. Licht et al (2010) reported 43% of 406 female college students had at least one dose of HPV vaccine. Among those vaccinated, 33% had two doses and 53% had completed the full three-dose series (Licht et al., 2010). Incomplete dosing decreases the likelihood of protection against HPV (Daley et al., 2010; Dunne et al., 2007; Lefkowitz et al., 2014; Licht et al., 2010; Manhart et al., 2011; Marchand et al., 2013). These studies that examined HPV vaccination reported demographic results that included: White, Hispanic, African Americans, and Asian Americans. Even though a few studies have examined predictors that included risk perception, religious adherence, and social influences that influenced college women in the US to adhere to HPV vaccination (Lefkowitz et al., 2014; Licht et al., 2010), literature is lacking on HPV vaccination in Middle Eastern college women in the US.

Meningitis Vaccine. The incidence of meningococcal meningitis in adolescents and young adults of college-age has been on the rise in the US. College students, particularly those living on campus, are at risk of contracting and transmitting the disease. The Center for Disease Control (CDC) Advisory Committee Immunization

Practices (ACIP) recommends freshman students living in residence halls receive information about meningococcal infection and the benefits of vaccination. During the 1998-1999 academic years, 88 cases of meningococcal infections were identified in the US, which resulted in the deaths of eight college students (Harrison, 2000). Studies since 2000 have reported the predictors on vaccination rates of college students in the US. Those studies reported that on average, 50% of the undergraduate students received the meningococcal vaccine. The predictors of having received the immunization were freshman living in dorms, age (18-22 years old); most likely due to parental influence; female; White; and enrolled in studies majoring in sciences, as opposed to humanities (D'Heilly, Ehlinger, & Nichol, 2006; Paneth et al., 2000). The literature is lacking in examining receipt of meningitis vaccination in Middle Eastern College women in the US.

Influenza Vaccine. There is a high incidence of influenza viruses that cause upper respiratory illnesses that commonly occur on college campuses. Influenza viruses are associated with student morbidity, impaired school performance, absenteeism, increased utilization of student health services, and lower levels of general health. In adults, influenza causes symptoms such as muscle aches, cough, fatigue, weakness, and elevated core body temperature. Close living and social spaces place college students living on campus at high risk for influenza (Bednarczyk et al., 2015; Nichol, D'Heilly, & Ehlinger, 2008).

Since 2005, few studies have examined influenza vaccine uptake on college campuses in the US. Among those studies, 30% of student volunteers self-reported influenza vaccine uptake. Vaccine uptake was also associated with significant reductions in student health services, antibiotic use, impaired school performance, absenteeism, and

over-all illness (Bednarczyk et al., 2015; Nichol et al., 2008). The literature is lacking in examining receipt of influenza vaccination in Middle Eastern College women in the US.

In summary, there are several studies examining age-appropriate immunization among college students. Limitations of these studies include the reliance on self-report, which could be subject to recall bias and social desirability biases. Further, studies have not investigated the rates and correlates of HPV, meningitis, and influenza vaccine among in Middle Eastern College women in the US.

Sexual Behaviors

Despite increased awareness and knowledge about contraception and protection against sexually transmitted diseases, college students often engage in risky sexual behaviors (Huber & Ersek, 2009). Risky sexual behavior defined by the CDC included ever-having had sexual intercourse prior to age 17 years, multiple sex partners (in lifetime and in the past year), sexual intercourse without a condom and/or birth control, and the use of drugs or alcohol before sex (Centers for Disease Control and Prevention, 2001, 2011). Among college women, risky sexual behaviors are a concern due to the new experience of living without parental supervision, lack of access to a healthcare provider, and embarrassment in obtaining condoms and contraception. In 2001, the rate of unintended pregnancy in the US among women ages 18-24 was 108 per 1,000 (Finer & Henshaw, 2006). Annually, there are approximately 12.6 million new cases of sexually transmitted infections (STIs) diagnosed each year, excluding HIV, in young adults under the age of twenty five (Control & Prevention, 2012).

Among several studies conducted in the US, 40-50% female college students reported engaging in unprotected sex (Civic, 2000; Control & Prevention, 2012; Flannery & Ellingson, 2003; Huber & Ersek, 2009; O'Sullivan, Udell, Montrose, Antonello, & Hoffman, 2010). Studies that examined the predictors of unprotected sex, reported, "I can't afford it", uncomfortable side effects, fear of parental discovery, unprepared/spontaneity, and denial that STIs or pregnancy "could ever happen to me" (Civic, 2000; Huber & Ersek, 2009; O'Sullivan et al., 2010).

Study limitations include under reporting by college students due to the questions related to stigmatized behavior. The use of convenience samples in these studies may not be representative of the entire student population. In addition, the literature is lacking in examining sexual behavior in Middle Eastern College women in the US.

Nutrition

In the US, the highest incidence for weight gain and obesity has been observed in 18-29 year-olds (Mokdad et al., 1999). The transition from high school to college or university has also been associated with weight gain and obesity (Deliens, Clarys, De Bourdeaudhuij, & Deforche, 2013). Cross sectional studies done on college/university campuses report an average weight gain of 2-7.7 kg (4.4-16.94 lbs.) during their first year of attendance (Deliens, Clarys, De Bourdeaudhuij, et al., 2013; Finlayson, Cecil, Higgs, Hill, & Hetherington, 2012; Serlachius, Hamer, & Wardle, 2007). Delienes et al (2013) described the university weight gain phenomenon, which is an increase in fat consumption from eating at student dining halls, the influence of social eating on food choices, increase in sedentary lifestyle, decrease in sleep, and stress related to academic pressure (Deliens, Clarys, Van Hecke, De Bourdeaudhuij, & Deforche, 2013).

Serlachius et al (2007) reported 61% of female students gained more weight as compared to male students, Finlayson et al (2012) reported higher weight changes in males than females in the first 3 months of the first semester and a higher increase in weight gain for females during their first 12 months of college attendance. Conversely, Deliens et al (2013) did not report differences by gender (Deliens, Clarys, Van Hecke, et al., 2013; Finlayson et al., 2012; Serlachius et al., 2007).

Several studies looked at perception of weight, which is reflected in body image. Excessive concern toward weight and appearance triggers anxiety, depression, and avoidance of social situations. The current ideal image of a woman's body among young adults in US universities is characterized by thinness (Korn, Gonen, Shaked, & Golan, 2013; Nicoli & Junior, 2011; Tamim et al., 2006; Wronka, Suliga, & Pawlinska-Chmara, 2013). In these studies ((Korn et al., 2013; Nicoli & Junior, 2011; Tamim et al., 2006; Wronka et al., 2013) the majority of females perceive themselves as overweight.

Dieting for weight loss in young female adults includes restricting caloric intake to more risky measures (e.g. diet pills, fasting, laxatives, and induced vomiting) (Laska, Pasch, Lust, Story, & Ehlinger, 2009; Tamim et al., 2006). Weight control and dieting is common among university students in Lebanon. Tamim et al. (2006) examined risky weight control measures in a cross-sectional study of university students in Beirut, Lebanon. Among the total number of students that reported extreme weight loss measures (122), 74% were female and 24% were male. Extreme weight control measures included pills, laxatives, herbal supplements, and induced vomiting (Tamim et al., 2006).

Consumption of energy drinks by university students is related to the subjective perception of alertness and improved physical endurance. Caffeine and taurine found in

these drinks have been shown to improve reaction time and perception of visual information, verbal reasoning, and attention. Side effects of energy drinks have been reported to include nervousness, irritability, insomnia, arrhythmia, and stomach upset (Alsunni & Badar, 2011).

Spierer et al (2013) looked at students in a U. S. university and found that among 212 students, 16% consumed energy drinks at least three times per week. Alsunni and Badar (2011) examined the use and effects of energy drinks among university students in Saudi Arabia. Among the total number of students (188) that reported consuming energy drinks regularly, 81.91% were male and 18.08% were female. Adverse effects were reported by 63% male users and 85.72% females (Alsunni & Badar, 2011).

The limitations of these studies that focused on nutritional aspects of university students is the under-estimation of weight gain, the under reporting of risky weight loss behavior, and the under reporting of the consumption of energy drinks. Although studies on energy drinks were conducted in the Middle East on Middle Eastern university students, there were no studies conducted in the US on Middle Eastern college women.

Physical Activity

The health benefits of physical activity are widely recognized and associated with decreased risks of chronic health conditions and obesity. Low levels of physical activity are associated with weight gain in college students. Studies that looked at US and European college students' participation in physical exercise reported higher exercise prevalence in male students compared to female and students that participated in exercise did not all meet recommended guidelines for physical activity (Korn et al., 2013; Laska et al., 2009; Lowry et al., 2000; Steptoe et al., 2002).

In a multi-national study, Haase et al (2004) examined health beliefs and risk awareness associated with physical activity in university students, using the International Health Behaviors Survey. The study included 19, 298 university students from the following participating countries: the US, North-Western Europe, the former socialist states of Central and Eastern Europe, Mediterranean countries, and those from the Pacific Asian rim, and the developing countries Columbia, South Africa and Venezuela. Physical activity three or more times per week was used as criterion for recommended levels of activity. Low levels of physical activity was least prevalent in the US and Western Europe and most prevalent in the developing countries. Overall, physical activity was reported to be higher in men than women and only 40%-60% of the students were aware that physical activity is related to cardiovascular disease risk. (Haase, Steptoe, Sallis, & Wardle, 2004). This study did not include university students from Middle Eastern countries. This reflects a major limitation in the literature, the lack of research on physical activity among Middle Eastern college students, particularly women.

Experiences of Unwanted Sexual Contact and Injury

Partner violence is a major health concern in the US. Annually partners physically or sexually assault 1.5 million women. Studies have also found high prevalence in intimate partner violence in Arab communities. Structural disadvantages e.g., language, gender roles, and experiences of discrimination, acculturative stressors, and patrilineal cultural norms increase the vulnerability of immigrant women from the Middle East. The rate of partner violence in southern Iraq was reported 7 times higher than in the US in a 2004 study (Barkho, Fakhouri, & Arnetz, 2010).

Intimate partner violence is also referred to as dating violence on college

campuses. Experiences of unwanted sexual contact and physical injury refers to the health behavior, as described by the CDC Behavioral Risk Factor Surveillance System (BRFSS). A study done on the US college campus recruited 598 students in dating relationships, 64% were female. Seventy-two percent reported perpetrating psychological aggression and 20% reported perpetrated physical violence over the past year (Bliton et al., 2015). A study by Amar and Gennaro (2005) recruited a sample of 863 US college women. The study reported that 48% of the women surveyed experienced partner violence (Amar & Gennaro, 2005). Studies were not found that focused on this unique population of Middle Eastern college women in the US.

Sociocultural Factors Related to Arabic Middle Eastern Culture

Family affiliation is the central most influential social institution of the Middle East. Whereby, the family is characterized by values that reflect interdependence, support, solidarity and, kinship (Haj Yahia, 2002). In the context of a collectivist society emphasis is placed upon group centeredness. Decisions are made based upon the good of the group and not the individual (Lipson, 1983).

Patriarchal factors in the Middle Eastern culture reflect restrictive behavior codes that emphasize male control over women, linking honor with female virtue, thus perpetuating male dominance over female dependence. In patriarchal Middle Eastern Arab societies, women are not expected to contest these gender arrangements (Haj Yahia, 2002). Al-badayneh (2012) asserts that men strictly regulate female behaviors and sexuality. Middle Eastern males maintain responsibility for protecting the family's dignity and reputation. Gender roles within the social culture define the behavior of men and women (Al-Badaynej, 2012).

Religiosity is defined in the literature as, belief in the existence of God or a higher power and the lived commitment to adhering to the principles and prescriptives that members of that religion believe have been defined by God or a higher power. Identifying with religion i.e. Muslim, Christianity, or Judaism may include attendance at religious services, intellectually acknowledging the religious values, however, extrinsically may not allow these religious principles to totally impact decisions and behavior (Schneider, Krieger, & Bayraktar, 2011). Hasnain and colleagues (2011) inform us that regardless of the Middle Eastern country of origin, religiosity may impact health related beliefs and practices of women, which include sexual norms, reproductive health, and gender concordance of health care providers. Islamic beliefs, whether Muslim or Christian, place value on modesty and conservatism and the lack of cultural accommodations contribute to reluctance of Middle Eastern women to seek healthcare (Hasnain, Connell, Menon, & Tranmer, 2011).

CHAPTER THREE

THEORETICAL MODEL

The theoretical model for the proposed study is an *Integrative Conceptual Framework* that builds on the original Health Belief Model, developed by Becker (1977), which has been updated and cited in recent literature (Aldohaian, Alshammari, & Arafah, 2019; Jones et al., 2015). This model addresses individual behavior. The second model that has been incorporated into the *Integrative Conceptual Framework* is the Social Ecological Model. This model is based upon the early ecological perspective described by Brofenbrenner (1979) and further developed, tested, and cited in recent literature (Baral, Logie, Grosso, Wirz, & Beyrer, 2013; Golden, McLeroy, Green, Earp, & Lieberman, 2015). The third model that has been incorporated into the *Integrative Conceptual Framework* is the Acculturation Model, originally described by Berry (1997), this model has been adapted, tested, and cited in recent literature (Gans, 2006; Ward, 2008). This model addresses culture and immigration related factors.

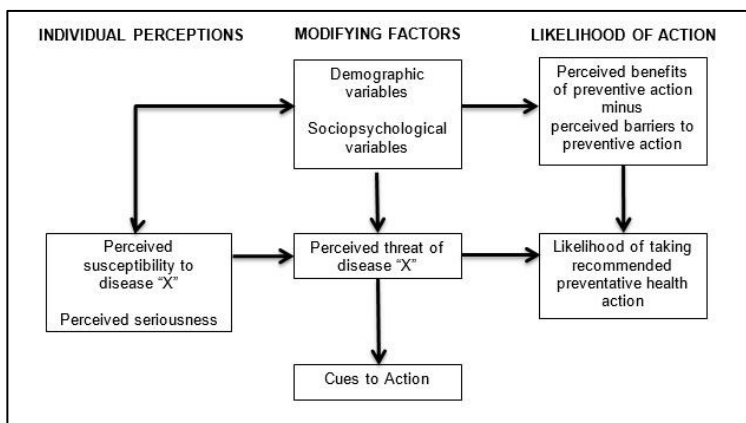
The Health Belief Model

The Health Belief Model (HBM), as shown in Figure 2, theorizes the likelihood that an individual will seek preventative care, health screening, or adhere to a prescribed health related regimen in the presence of perceived individual beliefs toward experiencing a health-related condition. These beliefs are: 1) personal vulnerability to the condition; 2) the consequences related to the seriousness of the condition; 3) the perception that adapted behavior will prevent the condition, and 4) the likelihood that the benefits of reducing the threat of the condition exceed the cost of taking action (Becker et al., 1977; Redding, Rossi, Rossi, Velicer, & Prochaska, 2000).

The key components of the model are perceived susceptibility, perceived severity/threat, barriers, and cues to action. *Perceived susceptibility* addresses when an individual feels vulnerable toward developing the condition. For example, the likelihood that an individual will participate in risky sexual behaviors without condoms or birth control will depend upon their belief that they are at risk for sexually transmitted infections or pregnancy. *Perceived severity / threat* refers to one's belief that they are susceptible to the threat of the disease or illness. For example, a woman may continue to smoke, despite the risk for cancer, if she perceives herself as "too young" to be concerned. *Cues to action* address the internal or external stimuli that motivate an individual to engage in health behavior. Internal stimuli may be physiological discomfort (e.g., pain) or psychosocial (e.g., religiosity). An individual may not seek cervical cancer screening if she is a virgin and perceives the exam to invade her intact hymen. Examples of external stimuli may include access to services or presence or absence of social support. An individual may be motivated to seek cervical cancer screening if there is access to care (e.g., a near-by free clinic).

Figure 2

Health Belief Model (HBM) (Becker & Janz, 1985)



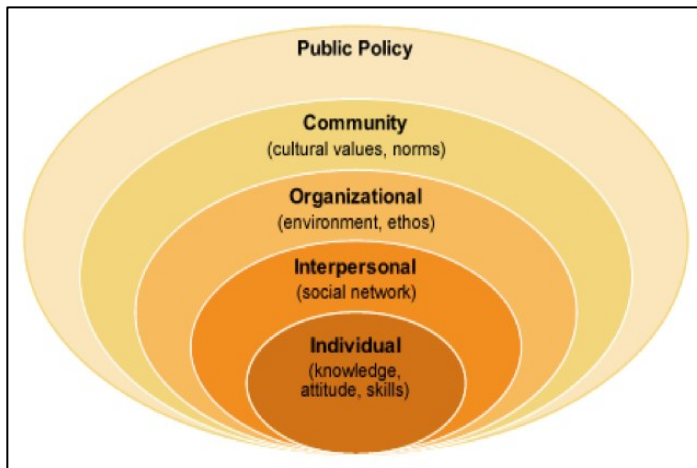
The Social Ecological Model

The Social Ecological Model (SEM) incorporates multiple levels of influence on health behavior. The levels of influence are intrapersonal factors, interpersonal processes, organizational factors, community factors, and public policy (McLeroy, Bibeau, Steckler, & Glanz, 1988), as shown in Figure 3.

The *intrapersonal/individual factors* are the unique characteristics of the individual (e.g., knowledge, self-concept, and religiosity). The *interpersonal processes* are family members, social relationships, and acquaintances that influence health related behaviors (e.g., social support, patriarchal views and beliefs). The *organizational factors* include institutional / organizational structures and processes that influence health behaviors (e.g., universities, having health insurance, and health centers). The *community factors* are the formal and informal networks that are operational within defined boundaries. Among these factors are mediating structures that include family, ethnic groups, advocacy groups, and neighborhoods. *Public policy* consists of regulatory laws and policies at the local, state and/or federal level. Policies and regulations that govern public safety are among these factors (e.g., housing, sanitation, and prohibition of tobacco sales to minors).

Figure 3

Social Ecological Model (Bronfenbrenner, 1977)



The Acculturation Model

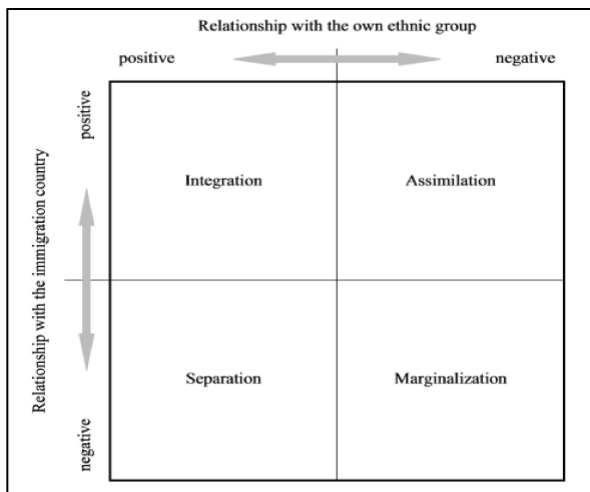
The Acculturation Model addresses culture and immigration related factors, (as shown in Figure 4). Acculturation is a phenomenon that incorporates the heritage culture of the individual or group, the mainstream culture of the society of settlement, and the processes and structures that may or may not bring about integration and assimilation into the mainstream culture. Among those variables are: 1) length of time the individual or groups are exposed to the mainstream culture; 2) positive or negative experiences that result in either acceptance or rejection of the mainstream culture, and 3) barriers to assimilation (e.g., language, education, discrimination) (Wekhian, 2015).

The dimensions of Acculturation Theory are integration, assimilation, separation, and marginalization, (as shown in Figure 4). Integration and assimilation are positive relationships with the mainstream culture, while separation and marginalization are negative relationships with the mainstream culture. *Integration* is the willingness of the mainstream culture and the heritage culture to allow participation in the mainstream

culture and the acceptance of retention of the heritage culture. *Assimilation* is the willingness of the mainstream culture to encourage participation while exerting pressure on the individual to abandon their heritage culture. Assimilation will occur if the individual willingly participates in the mainstream culture and willingly abandons their heritage culture. *Separation* occurs when the individual is unwilling to participate in the mainstream culture, however, retains their heritage culture, often seeking the familiarity and intimacy within their ethnic enclaves. *Marginalization* occurs when the mainstream culture and the individual are both unwilling to accept their participation in the mainstream culture, consequently the individual avoids interaction with the mainstream culture while abandoning their heritage culture (Chebel d'Appollonia, 2015).

Figure 4

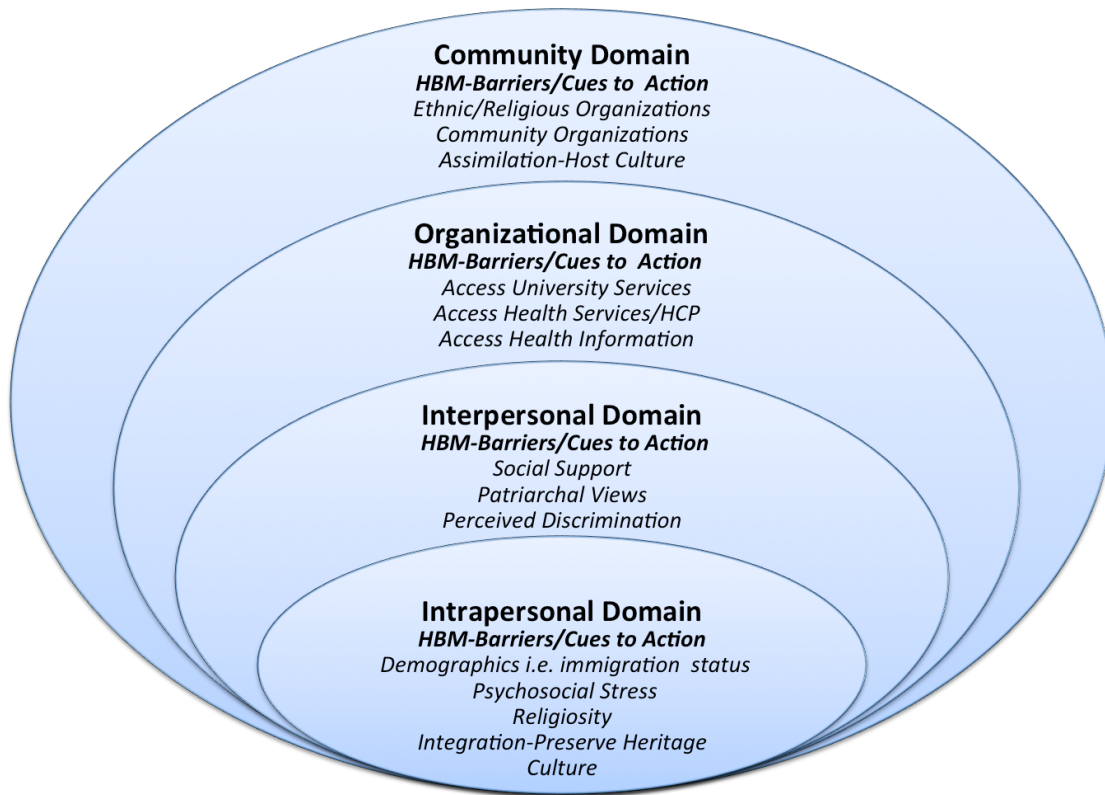
Acculturation Theory Model (Schmitz & Schmitz, 2012)



The Integrative Conceptual Framework

The *Integrative Conceptual Framework* for this study builds upon the three conceptual models described above and creates a multilevel approach to examine factors

that influence health behaviors among Middle Eastern college women in the US. This integrative model approach considers the individual factors within a broader social and community context, (as shown in Figure 5). The model incorporates the multi-level domains from the SEM regarding individual, interpersonal, organizational, and community factors that influence health behaviors within the target population. This study does not address the policy domain. The policy domain involves additional complex variables and policy evaluation methods, which require a different approach from this study. Components derived further from the HBM expand these domains by addressing individual factors that influence health behaviors focusing on barriers and cues to action in relation to access to healthcare services and resources. The barriers and cues to action are demographics, sociocultural factors, and access to care. This study does not address the perceived susceptibility or perceived severity / threat components of the HBM. These components can be addressed in a future study. The Acculturation Model is integrated in the framework to address the influence of acculturation and assimilation on health behaviors. Whether born as an American or having immigrated to the US, Middle Eastern young adults may experience challenges related to maintaining their heritage culture's traditions, religion, and values and the degree to which they participate in mainstream American traditions (Wekhian, 2015)

Figure 5*Integrative Conceptual Framework*

As shown in Figure 5, the Intrapersonal Domain addresses the individual factors of this study, including demographic information (e.g., immigration status and religious affiliation) psychosocial stress and religiosity that may influence health behaviors as barriers or cues to action. The integration of acculturation, proposes the individual's preservation of the heritage culture while participating in the mainstream culture. The Interpersonal Domain addresses the sociocultural factors in this study, which includes, social support, patriarchal views, and perceived discrimination, which influence health behaviors as barriers or cues to action. The Organizational Domain addresses access to university services (e.g. food, healthcare services, provisions for exercise, and physical

activity), and access to care factors (e.g. health care provider, access to health information, and having health insurance) that may influence health behaviors as barriers or cues to action. Availability and access to health services matters. Without access, age-appropriate immunizations or cervical cancer screening will not occur. The Community Domain addresses affiliation with ethnic/religious organizations and affiliation with community organization that may influence health behaviors as barriers or cues to action. The influence of ethnic/religious organizations may oppose or restrict assimilation into the host culture. However, the influence of community organizations may also facilitate assimilation into the host culture and positively influence health behaviors.

CHAPTER FOUR

METHODS

Design

This descriptive correlational study examined the rates and correlates of health behaviors among Middle Eastern college women in the US. The study answered the following research questions:

1. What is the prevalence of health behaviors (*smoking, cervical cancer screening, age appropriate immunizations, sexual behaviors, nutrition, physical activity, and experiences of unwanted sexual contact and injury*) among Middle Eastern college women in the United States?
2. Is there an association between health behaviors and *demographic characteristics* (e.g., age, marital status, immigration generation status, religious affiliation, etc.) among Middle Eastern college women in the United States?
3. Is there an association between health behaviors and *sociocultural factors* (e.g. social support, perceived discrimination, religiosity, acculturation, and patriarchal beliefs) among Middle Eastern college women in the United States?
4. Is there an association between health behaviors and *access to services* (e.g. having a healthcare provider, health insurance, and access to health information) among Middle Eastern college women in the United States?

Study Sample and Recruitment

This study included 406 adult women. Information on the power sample analysis and sample size calculation is detailed in Appendix 1. This study included adult college

women ages 18 years and above, whom self-identified as Middle Eastern of Arabic background. This included women from Middle Eastern Arabic countries, including Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syria, United American Emirates, and Yemen. Women from non-Arabic Middle Eastern countries (i.e., Iran, Israel, and Turkey) were not included because of dissimilar traditions and languages that required research to focus solely on them. Middle Easterners from Arabic countries share conservative views and similar linguistics. Those from non-Arabic Middle Eastern counties e.g. Israel and Turkey live in more liberal societies. Iran is wide blend of conservative and liberal groups, whom have liberal views in the US.

Additionally, women from North African countries (i.e., Libya, Tunisia, and Morocco) were excluded from the study because they represented a very small portion of Middle Eastern Arabs in New Jersey (Arab American Institute, 2009-2015). Immigration from these counties have decreased compared to the nineteen seventies and eighties.

Eligibility criteria also included immigrant generation status (first or second generation immigrant or on a student visa) and identifying oneself as a current college student or a recent graduate within the past six months. First and second generation immigrant was selected as an eligibility criteria to exclude 3rd generation immigrants because their health behaviors, based upon the literature, more closely resembles mainstream American culture, rather than their heritage culture.

Targeting Middle Eastern student organizations and community organizations with the assistance of Middle Eastern student collaborators for survey advertisement and recruitment was a strategy incorporated as a validity check to increase the insurability of targeted Middle Eastern female college student participants. Steptoe and colleagues have

used the strategy of engaging student collaborators to assist in data collection by encouraging student participation (Steptoe et al., 2002). Collaborating with a core group of Middle Eastern college students assisted this researcher to navigate Middle Eastern/Arabic cultural, religious, and social events in New Brunswick, Newark, and Paterson, New Jersey. Their presence increased the credibility of this researcher and the research study. This approach to target groups of Middle Eastern women with a cultural navigator opened opportunities to recruit study participants (Krebbs et al., 2013). Recruitment of study participants also occurred electronically and on printed material (flyers). The study advertisement contained study title, eligibility information, an electronic link to the survey, and QR Scanner, which enabled study participants to access the survey on a mobile device.

The study was advertised on the Rutgers Campuses, Newark, and New Brunswick, New Jersey. Electronic advertisement occurred through Rutgers School of Nursing, Rutgers Student Senate, Rutgers University Muslim Student Association, Rutgers Arab Cultural Club, Palestinian American Community Center, and Rutgers University Global Studies Department, by email and through social media (e.g. Facebook pages and twitter).

Study Variables and Measurement

A summary of study variables and measurement is shown in Table 1. Detailed information about the variables and survey questions are included in Appendix 2. The IRB approved survey instrument is included in Appendix 3. The total number of items for the study survey was 103. The time estimated for completing the survey was 20-30 minutes. The study survey was reviewed and pilot tested by a group of five Middle

Eastern college women, of Arabic descent. In a focus meeting with this group of students, survey questions were revised to ensure cultural appropriateness and sensitivity, clarity of the questions, and relevance to the targeted study population.

The study outcomes, the dependent variables, were *health behaviors*, as defined by the Center of Disease Control (CDC) - Behavioral Risk Factor Surveillance System (BRFSS). Health behaviors addressed in this study were measured using relevant questions from the BRFSS and YRBSS (Youth Risk Behavior Surveillance System), as shown in Table 1. The BRFSS is the nation's system of health-related surveys that collects state data about US residents regarding their health-related risk behaviors, chronic health conditions, and use of preventive services (Centers for Disease Control and Prevention, 2014). The YRBSS was developed in 1990 to monitor priority health risk behaviors that contribute to the leading causes of death, disability, and social problems among youth and young adults in the US. The questions in the YRBSS regarding sexual behaviors are more appropriate for young adults (Centers for Disease Control and Prevention, 2011).

The **study outcomes** were health behaviors including smoking, cervical cancer screening, age-appropriate immunizations, sexual behaviors, nutrition, physical activity, and experiences of unwanted sexual contact and injury (Centers for Disease Control and Prevention, 2001, 2011, 2012, 2013, 2014). *Smoking* was measured using the 2014 BRFSS survey questions (Centers for Disease Control and Prevention, 2014). One item was added to the BRFSS smoking questions based upon the work of Braun (2012) and Nuzzo (2013) reporting of hookah-smoking behavior in college students in the US. *Cervical cancer screening* and HPV screening was measured using the 2014 BRFSS

questions (Centers for Disease Control and Prevention, 2014). Age-appropriate immunizations included HPV, influenza, and meningitis vaccines. The HPV and influenza immunizations were measured using two questions from the 2014 BRFSS survey (Centers for Disease Control and Prevention, 2014). One item was added based upon the work of Harrison (2000) and Paneth (2000), reporting meningitis infection in college students (Harrison, 2000; Paneth et al., 2000). Sexual behaviors were measured using items from the 2011 YRBSS (Centers for Disease Control and Prevention, 2011). Nutrition was measured using five questions from the 2001, 2012, and 2013 BRFSS surveys (Centers for Disease Control and Prevention, 2001, 2012, 2013). Physical Activity was measured using five questions from the 2001 and 2013 BRFSS surveys (Centers for Disease Control and Prevention, 2001, 2013). Experiences of unwanted sexual contact and injury were measured using five questions from the 2007 BRFSS survey, titled, "dating and sexual violence" (Centers for Disease Control and Prevention, 2007).

The **study predictors**, the independent variables, were demographic characteristics, socio-cultural factors, and access to services. Demographic characteristics in this study included age, country of birth, US citizen status, immigration generation status, country of family origin, student status (full-time vs. part-time), type of health insurance, marital status, place of residence (campus, off-campus, with parents), sources of income (parent, earned, or scholarship), parent's level of education, parent's occupation, reason for immigration to the US, religion, and affiliation with religious / student/ community organizations.

Socio-cultural factors included psychosocial factors (social support, psychosocial stress, and perceived discrimination) and cultural factors (religiosity, acculturation,

sexual beliefs, and patriarchal beliefs). The questions are shown in Appendix 2 (Centers for Disease Control and Prevention, 2007). *Social support* in this study referred to a person's access to supportive individuals and resources that can positively affect personal adjustment, social behavior, health maintenance, and recovery from illness (Sarason, Sarason, Shearin, & Pierce, 1987). Social Support was measured using five questions from the ENRICH Social Support Instrument (ESSI)(Vaglio et al., 2004). The respondents were asked to rate the availability of a network member to provide emotional and informational support. An affirmative response is worth 4 points and a negative response 2 points. Individual items are summed for a total score, with higher scores indicating greater social support. Based on a sample of 196 pilot participants, the ESSI shows good internal consistency, with a Cronbach's α of .86. Gottlieb and Bergen (2010) tested the ESSI with a sample of 200 Chinese immigrants with hypertension and also showed adequate internal consistency, with a Cronbach's α of .91 and item-total correlations ranging from .70 to .84 (Gottlieb & Bergen, 2010). This instrument has been used in various disciplines in research (Hughes et al., 2014; Johnson, Jacobson, Gazmararian, & Blake, 2010; Steger, Mann, Michels, & Cooper, 2009).

Psychosocial stress in this study is defined as the individual's perception of a psychological situation. According to Lazarus (1993), the effects that stress has on a person are based more on the person's feelings of threat, vulnerability, and ability to cope rather than on the stressful event itself. Psychological stress is a relationship between the person and the environment that is perceived by the person as challenging or exceeding his or her own resources and a threat to their own wellbeing (Lazarus, 1993).

Psychosocial stress in this study was measured using the Perceived Stress Scale (PSS)

(Cohen, Kamarck, & Mermelstein, 1983). The PSS is a 4-item instrument that measures the degree to which individuals find their lives stressful, including the degree to which they find their lives unpredictable, uncontrollable, and overloading. Coefficient α reliabilities range from 0.84-0.86, and short-term test-retest reliability is 0.85; concurrent validity and predictive validity have been established. Higher scores represent higher levels of perceived stress. The instrument has been used in several violence studies with women from various settings and ethnic backgrounds (Datner, Wiebe, Brensinger, & Nelson, 2007; Smith et al., 2014; Temple, Weston, Rodriguez, & Marshall, 2007; Tutty, Bidgood, Rothery, & Bidgood, 2001).

Perceived discrimination is defined as negative portrayals based upon externally attributed identities that transform the ways that individuals shape their identities and invoke a sense of alienation (Rousseau, Hassan, Moreau, & Thombs, 2011). It has been reported that negative portrayals based upon external attributes (appearance, dress, and names) transform the way in which individuals shape their identities and perceive belonging to the host community (J. G. Read, 2008; Sarroub, 2005). Perceived discrimination in this study was measured using the eleven items adapted from the Perceived Religious Discrimination Scale (PRDS) (Rippy & Newman, 2008). The original PRDS is a 33-item scale. For this study, the PRSD was modified to reflect the ethnic context of perceived Middle Eastern discrimination as opposed to the context of perceived religious discrimination. Questions not relevant to this population of Middle Eastern women were removed. The original scale contained three subscales; religious prejudice and stigmatization, bicultural identification and conflict, and the third subscale, exposure to a discriminatory environment. In this study, we used only questions related to

prejudice and stigmatization and exposure to a discriminatory environment. Each item is answered on a 4-point Likert scale with responses ranging from "never" to "often", higher scores are indicative of more perceived discrimination. The internal consistency reliability for the entire PRDS scale is ($\alpha = .92$); 33 items (Rippy & Newman, 2008).

Religiosity is defined as the extent one practices and adhere to the laws and customs of their religion (Haj-Yahia, 2002). Religiosity in this study was measured using a 3-item instrument developed by Haj-Yahia (1998), to measure the level of religiosity among Arab women. Responses to these items are scored on a 6-point Likert-type scale (1 = *not at all* to 6 = *to a great extent*), with total possible scores ranging between 3 and 18. Higher scores are indicative of higher religiosity. This scale has adequate internal consistency with Cronbach's alpha coefficient at 0.87 (Haj Yahia, 2002).

Acculturation is a process by which an individual must negotiate a new host culture while determining whether to maintain the practices and beliefs of his or her own heritage culture (Aldohaian et al., 2019). Acculturation in this study was measured using 18 items from the Vancouver Index of Acculturation (VIA) (Ryder, Alden, & Paulhus, 2000). The VIA uses a bi-dimensional model to measure the degree to which an individual displays characteristics or behaviors associated with each culture, using a Likert scale ("Strongly Disagree" to "Strongly Agree"). Items on the VIA are categorized as values, social relationships, and adherence to traditions. Nine items are based on North American culture and nine items are based on the heritage culture. Reliability ranges from 0.82 to 0.91 for Heritage Culture and 0.85 to 0.89 for the Mainstream Culture subscale. Internal consistency reliability for the current study was $\alpha = .86$ for Mainstream Culture and ($\alpha = .94$) for Heritage Culture. An overall mean is calculated for each scale.

Higher scores on the acculturation scale (mainstream or heritage) indicate lower levels of acculturation (mainstream or heritage).

Sexual beliefs refer to the attitudes and behaviors related to beliefs toward sexuality (Askun & Ataca, 2007). In this study, this included woman's beliefs about sexual relations outside of marriage, and was measured using two instruments, *Attitudes Toward Premarital Sexuality* (Askun & Ataca, 2007) and *Perceived Parental Attitudes about Sexuality Scale* (Sprecher, 1989). Higher scores on the Beliefs Towards Sexuality Scale indicate more conservative views toward sexuality.

Patriarchal beliefs include the continuum of holding traditional-versus-egalitarian views of gender roles. Patriarchal beliefs in this study were measured using the Attitudes toward Women Scale Spence and Helmreich's (1978). The scale measures traditional-patriarchal attitudes versus liberal-egalitarian attitudes toward women. High internal consistency was found in the shortened version (Cronbach's $\alpha = .89$). Women were asked to indicate the extent to which they agree or disagree with each of the 15 statements based on a scale ranging from (*strongly agree*) to (*strongly disagree*). Higher scores on the Attitudes Towards Women Scale, indicates more liberal/egalitarian attitudes towards women. The study found high internal reliability for the Arabic version of the scale (Cronbach's $\alpha = 0.87$) (Haj-Yahia, 2002).

Access and utilization of health services in this study include having a healthcare provider, access and utilization of health services, and access to health information. This was measured using six questions from the 2014 BRFSS (Centers for Disease Control and Prevention, 2014) (as shown in Table 1). Three items have been added to address access to a gynecologist and/or women's health services and access to health information.

Table 1*Study variables*

Variable	Instrument / BRFSS-YRBSS Question Numbers	Items	Measurement
Dependent Variables / Outcomes			
Smoking	2014 BRFSS Q 9.2-9.3 See Appendix 2 for additional (1) question on hookah smoking	3	Categorical
Cervical Cancer Screening	2014 BRFSS Q 15.5 and 15.6 2014 BRFSS Module 10: Q 1-2	4	Categorical
Age-appropriate immunizations	2014 BRFSS Module 11: Q1-2 2014 BRFSS Q11.2 See Appendix 2 for additional (1) question on meningitis vaccine	4	Categorical
Sexual behaviors	2011 YRBSS Q 58-61, 63,64	6	Categorical
Nutrition	2013 BRFSS Module 5: Q2 2012 BRFSS Module 5: Q3 2001 BRFSS Module 11: Q1-3	5	Categorical
Dating/Sexual Violence	2007 BRFSS Module 18: Q1, 2, 4, 5, 6	5	Categorical
Independent Variables / Predictors			
<i>Demographic Characteristics</i>	Age, country of birth, US citizen status, immigration generation status, number of years in US, country of family origin, current place of residence, parent's residence, student status, paid work status, % of time in class and paid work per week, source of tuition, source of money for personal expenses, type of health insurance, marital status, parents level of education, parent's occupation, reason for family immigration to the US, religion, affiliation with religious / student community organization, social network on a daily basis	21	Categorical
<u>Sociocultural Factors</u>			
Psychosocial			
Social Support	Enriched Social Support Instrument (ESSI) (Vaglio et al., 2004)	4	Continuous
Psychosocial Stress	Perceived Stress Scale (Cohen et al., 1983)	4	Continuous
Perceived Discrimination	Perceived Religious Discrimination Scale (Kim, Sellbom, & Ford, 2014; Rippey & Newman, 2008)	11	Continuous
<u>Sociocultural Factors</u>			
Cultural			
Religiosity	Religiosity Scale (Haj-Yahia, 2002)	4	Continuous
Acculturation	Vancouver Index of Acculturation (Ryder et al., 2000)	18	Continuous

Sexual Beliefs	Attitudes Toward Premarital Sexuality (Askun & Ataca, 2007)	8	Continuous
	Perceived Parental Attitudes about Sexuality Scale (Sprecher, 1989)		
Patriarchal Beliefs	Attitudes Toward Women Scale (Spence & Helmreich, 1978)	15	Continuous
<i>Access and Utilization of Services</i>	2014 BRFSS Q3.2, 3.3, 3.4 See Appendix 2 for additional (3) questions on access to gynecologist or Women's Health Clinic and access to health information	6	Categorical

Note. Detailed table with the full study questions is included in Appendix 2

Note. Survey

Instrument is included in Appendix 3

Study Procedures

The on-line participation and survey completion strategy has been successfully used by Nuzzo et al (2013) in a study that examined hookah smoking among US college students. Random samples of 2400 students were invited to participate in an on-line survey via broadcast e-mail. A 36% (852) response rate was obtained (Nuzzo et al., 2013). This strategy was also used by Ritter et al (2004), in a study that compared Internet accessed versus mailed questionnaires. The study concluded that Internet participation was as good, if not better than assigned mailed questionnaires (Ritter, Lorig, Laurent, & Matthews, 2004).

The on-line survey was posted on REDCap for access and completion. This secure research data capturing software does not identify research participants or track IP addresses. REDCap was used to collect and manage all survey data. REDCap is a secure web application designed to support data capture for research studies, which provides an intuitive interface for users to enter data and have real- time validation rules at the time of entry. **REDCap does not collect IP addresses.** REDCap servers are securely housed in

an on-site limited access data center managed by Rutgers University. All web-based information transmission is encrypted. All transactions are securely delivered to the application using SSL (SHA-1 with RSA Encryption; 2048-bits. Data transmissions are protected internally at the Rutgers University database server by a firewall. Access to the data is managed by institutionally sponsored login IDs. The REDCap system fully relies upon identity and access management infrastructure at Rutgers University. Password complexity, history, and expiration standards are implemented by Rutgers University (<https://research.njms.rutgers.edu/redcap/index.php?action=help>).

Data Analysis

SPSS (Statistical Package for the Social Sciences) software was used for the statistical analysis of the study data. The statistical analysis tested the hypothesis and built predictive models of factors associated with health behaviors among Middle Eastern college women. The analysis proceeded in three stages. The first stage consisted of descriptive (univariate) analysis. The categorical study items were summarized using frequencies and proportions (shown in Table 2). The second stage consisted of bivariate analysis. Chi-square was used to examine the effect of the categorical predictors on health behaviors. The t-test was used to examine the effect of the continuous predictors on health behaviors.

The third stage consisted of multivariate regression analysis, which builds models of the predictors (demographics, sociocultural factors, and access to services) for health behaviors (smoking, cervical cancer screening, age-appropriate immunizations, sexual behaviors, nutrition, physical activity, and experiences of unwanted sexual contact and injury). Predictors that were found significant in the bivariate analysis at $p < 0.05$ were

included the multivariate analysis. The multivariate analysis included the calculation of adjusted odds ratios to estimate the magnitude of the associations, with 95% confidence intervals. To control for Type I error, the level of significance (α) was set at 0.05 and compared to the calculated p values. The risk of Type II error was controlled by (β) 0.20.

Protection of Human Subjects

Approval to conduct the study was obtained from the Rutgers University Biomedical and Health Sciences (RBHS) Institutional Review Board (IRB). This researcher completed the required Protection of Human Subjects Training. All study procedures were carried out in accordance with IRB and human subjects protection regulations and guidelines.

Voluntary Participation

Study participants were informed that participation in the study was strictly voluntary and that they were not obligated or required to participate in the study survey. Interested participants were provided information about the study and were given opportunities to ask questions and have their questions answered. Study participants were asked to indicate via checking the appropriate boxes on the online survey that they received information about the study and consented to complete the survey. Participants were informed that they may choose to withdraw from the study by stopping the survey at any time, no questions asked. All participants (including those who completed the survey, withdraw or deemed ineligible to participate) were provided with links to student/local health services.

Risks and benefits

There were no known risks associated with taking part in the study. Study participants were not compensated for their participation in the study. However, this researcher was able to secure a grant, provided by Rutgers University School of Nursing, which enabled the funding of incentives for the participants. At the end of the survey, the participants were invited to enter a raffle for a \$50.00 gift card. A total of thirty-\$50.00 gift cards was purchased. The odds of winning a gift card were 13 to 1. Entry into the raffle was voluntary. Winner selections were random. At the end of the survey, participants were invited to enter the raffle, by entering their contact information (email address or telephone number) into a fill-in box. The name and email address or phone number was immediately separated from the data file. Once the raffle was completed and the gift cards were provided to the winning participants, names and contact information were deleted.

Although there were no direct benefits from the study for the participant, the study will benefit the target community by informing the development of interventions to improve the health and wellbeing of Middle Eastern college women. Study participants were informed of the potential risks and benefits of participating in the study. This information was provided in an electronic informed consent.

Privacy and Confidentiality

No personal identifiers or data on protected health information (PHI) were collected from study participants. All materials related to the study were secured in a locked file cabinet located in the research office at the School of Nursing. All electronic study files are kept on a password-protected computer, with encryption capabilities. This

researcher made every attempt to protect the privacy of participants and confidentiality of the study data.

CHAPTER FIVE

RESULTS

Characteristics of the Study Sample

This descriptive correlational study examined the rates and correlates of health behaviors among Middle Eastern college women in the US. The study answered the following research questions:

1. What is the prevalence of health behaviors (*smoking, cervical cancer screening, age appropriate immunizations, sexual behaviors, nutrition, physical activity, and experiences of unwanted sexual contact and injury*) among Middle Eastern college women in the United States?
2. Is there an association between health behaviors and *demographic characteristics* (e.g., age, marital status, immigration generation status, religious affiliation, etc.) among Middle Eastern college women in the United States?
3. Is there an association between health behaviors and *sociocultural factors* (e.g. social support, perceived discrimination, religiosity, acculturation, and patriarchal beliefs) among Middle Eastern college women in the United States?
4. Is there an association between health behaviors and *access to services* (e.g. having a healthcare provider, health insurance, and access to health information) among Middle Eastern college women in the United States?

The study sample included 406 women of Middle Eastern background who were currently enrolled in college or recently graduated from college. The mean age of the participants was 21 years. Characteristics of the study sample are shown in Table 2. Most of the participants reported being single (70%), born in the United States (80%), and

second-generation immigrants (73%). Regarding the reasons for immigrating to the US, 64% reported socio-economic reasons, 57% reported education, and 30% reported seeking political freedom.

Regarding religious affiliation, 64% reported being Muslim and 32% being Christian. Participant involvement in organizations was reported as 36% belonging to student organizations and 30% belonging to religious or community organizations. Most participants reported that their daily interactions were with an equal mix of Middle Eastern and Non-Middle Eastern students (47%), while 27% had daily interactions with mostly Middle Eastern students, and 25% had daily interactions with mostly non-Middle Eastern students.

Regarding the participants' place of residence, 30% resided in university housing (on or off campus) and 70% resided with parents or other relatives. Regarding college enrollment status, 85% are full-time students and 80% are in undergraduate programs. Regarding employment status, 53% reported full-time or part-time employment. Regarding parental education, 58% had mothers with college/graduate degrees and 85% had fathers with college/graduate degrees.

Regarding access to healthcare, 93% had access through health insurance, 73% had private health insurance, 20% had health insurance through the university, and 7% had no health insurance. Regarding access to health information, 61% accessed health information through the Internet, 74% accessed health information from family and friends, and 5% accessed health information from the television.

Table 2*Characteristics of the study sample - socio-demographic variables*

Variables	Categories	n	%
Country of Birth	United States	320	80.8
	Outside the US	76	19.2
Immigration Generation Status	1st Generation	102	25.3
	2nd Generation	294	73.0
	Student/Visitor Visa	7	1.7
US Citizenship/Residency Status	Born in US	299	74.2
	Naturalized	61	15.1
	Student/Temporary Visa	43	10.7
Current Place of Residence	Campus housing	119	29.8
	Off campus, with parents/relatives	281	70.2
Parents Residence	New Jersey	290	72.3
	Other parts of US	85	21.2
	Abroad	26	6.5
Student Attendance Status	Full Time	334	85.4
	Part Time	57	14.6
Student Status	Undergraduate	307	80.2
	Graduate	76	19.8
Paid Work Status	Full Time	66	16.4
	Part Time	148	36.8
	Not Working	188	46.8
% Ratio Class Time to Paid Work Time	80-100% class and 0-20% work	73	34
	60-80% class and 20-40% work	56	26
	<60% class and >40 work	85	40
Health Insurance	Private	292	73.6
	Through University	79	19.9
	None	26	6.5
Marital Status	Single	279	69.6
	Not Single	122	30.4
Mothers Education	High School or less	167	41.9
	College/Graduate Degree	232	58.1
Fathers Education	High School or less	61	15.3
	College/Graduate Degree	339	84.7
Reason for Immigration to US you/parents*	Education	231	57.2
	Socio Economic	258	63.9
	Political Freedom	121	30.0
	Other	32	7.9
Religion	Christian	127	31.9
	Muslim	257	64.6
	Other	14	3.5
Do you belong to...*	Student Organization	146	36.1
	Community Organization	137	33.9
	Religious Organization	137	33.9
	Other	11	2.7
Who do you mostly interact with on a daily basis	Mostly Middle Eastern students	109	27.6
	Mostly non-Middle Eastern students	101	25.6
	Equal mix of both	185	46.8
Access to Healthcare	No	26	6.5
	Yes	371	93.5
Sources of Health	Internet	245	60.6

Information*	Family/Friends	297	73.5
	Television	19	4.7

Note. Survey responses items included, select all that apply. Percentages total more than 100%.

The means and standard deviations (SD) for the socio-cultural beliefs e.g., acculturation, social support, psychosocial stress, perceived discrimination; attitudes toward women, sexual beliefs, and religiosity have been calculated, (as shown in Table 3). The study outcomes included health behaviors related to smoking, cervical cancer screening, age appropriate immunizations, sexual behaviors, body weight, nutrition, physical activity in college women, and experiences of unwanted sexual contact and injury. The frequencies and proportions of health behaviors have been calculated, (as shown in Table 4).

Table 3

Characteristics of the study sample - continuous variables

	n	Mean	Std. Deviation
Age	387	20.93	4.408
Acculturation Heritage	379	17.84	7.017
Acculturation Mainstream	377	20.33	6.269
Social Support	381	17.52	2.697
Psychosocial Stress	388	7.96	2.733
Perceived Discrimination	386	29.05	7.010
Attitude Toward Women	365	45.51	9.677
Sexual Beliefs	370	22.16	4.604
Religiosity	380	13.54	2.726

Table 4*Characteristics of the study sample - health behaviors*

	Variables	Categories	n	%
Smoking	Cigarettes smoking	Every day/Some days Not at all	84 316	21.1 79.0
	Hookah smoking	Every day/Some days Not at all	79 325	19.6 80.4
	Trying to quit smoking in past year	Yes	53	13.6
Pap & HPV tests	Ever had a Pap test	Yes	97	24.4
	Time of last Pap test	Within the past year 2 years or more	67 29	69.8 30.2
	Ever had an HPV test	Yes	65	16.1
Vaccines	Ever had an HPV vaccine	Yes	148	36.9
	Had flu vaccine, in past year	Yes	264	65.7
	Had meningitis vaccine	Yes	245	61.3
Sexual Behavior	Had sexual intercourse	Yes	244	60.7
	Use a condom, last time	Yes	139	57.4
	Contraception method, last time	None	54	22.2
		Birth Control Pills	55	22.6
		Condoms	120	49.4
		Implant/Other	14	5.7
Body Weight	Trying to lose weight	Yes	169	42.6
	Maintaining weight	Yes	162	40.7
	Eating less calories to avoid weight gain	Yes	170	42.1
	Eating less fat to avoid weight gain	Yes	164	40.6
Physical Activity	Partake in physical activity/exercise	Yes	149	37.3
	Partake in physical activity to lose weight	Yes	79	19.6
	Partake physical activity to avoid weight gain	Yes	59	14.6
	Partake physical activity for recreation	Yes	71	17.6
Experiences of unwanted physical contact / injury	Ever been threatened with physical violence	Yes	44	11.1
	Ever experienced physical violence	Yes	40	10.1
	Ever experienced unwanted sexual contact	Yes	66	16.6
	Past year experienced physical violence	Yes	21	5.3
	Past year experienced physical injuries	Yes	9	2.3

Smoking

In this study, 21% of the woman reported smoking cigarettes and 19% reported smoking hookah. Among those who reported smoking, 13% reported trying to quit in the last year. Chi-square tests were used to examine the bivariate associations between smoking and the categorical predictors, as shown in Table 5. Cigarette smoking was only

associated with reported daily interactions

$X^2 (2, N= 391) = 6.369, p = .041$, in which cigarette smoking was highest among those who reported interacting with an equal mix of both Middle Eastern and non-Middle Eastern individuals. Cigarette smoking was not significantly associated with the remaining categorical predictors in this study.

Hookah smoking was significantly associated with student attendance status, marital status, religion, belonging to student and religious organizations, and with sources of health information. Hookah smoking was higher among students who are full-time $X^2 (1, N= 387) = 6.987, p = .008$, single $X^2 (1, N=401) = 4.494, p = .034$, Muslim $X^2 (1, N=389) = 7.160, p = .007$, as well as those whom reported belonging to student $X^2 (1, N=404) = 14.237, p < .001$, and religious organizations $X^2 (1, N=404) = 7.320, p = .007$, and those whom obtain health information from the Internet $X^2 (1, N=404) = 5.449, p = .020$.

Table 5

Bivariate analysis of the associations between smoking (cigarettes and hookah) and the categorical study predictors, using chi-Square

Variable	Categories	Cigarette Smoking		Hookah Smoking	
		%	$X^2 (P)$	%	$X^2 (P)$
US born	No	20.2%	.063	22.1%	.561
	Yes	21.4%	(.802)	18.7%	(.454)
Parents live in NJ	No	25.5%	1.683	14.4%	2.711
	Yes	19.5%	(.194)	21.7%	(.100)
Student attendance status	Full time	19.9%	.748	22.8%	6.987
	Part time	25.0%	(.387)	7.0%	(.008)
Student status	Undergraduate	21.6%	.265	20.8%	.531
	Graduate	18.9%	(.607)	17.1%	(.466)
Full-time work	No	19.2%	3.303	19.0%	.165
	Yes	29.2%	(.069)	21.2%	(.684)
Single	No	26.4%	3.230	13.1%	4.494
	Yes	18.5%	(.072)	22.2%	(.034)
Mother_college	No	19.9%	.222	18.6%	.178
	Yes	21.8%	(.638)	20.3%	(.673)
Father_college	No	15.0%	1.516	24.6%	1.188

	Yes	22.0%	(.218)	18.6%	(.276)
Immigrated to US education	No	21.9%	.141	21.4%	.646
	Yes	20.3%	(.707)	18.2%	(.422)
Immigrated to US socioeconomic	No	21.5%	.038	22.6%	1.350
	Yes	20.7%	(.846)	17.8%	(.245)
Religion	Christian	26.8%	3.387	11.8%	7.160
	Muslim	18.6%	(.066)	23.3%	(.007)
Belongs to Student Organizations	No	22.0%	.391	14.0%	14.237
	Yes	19.3%	(.532)	29.5%	(< .001)
Belongs to Relig. Organizations	No	22.7%	1.396	15.7%	7.320
	Yes	17.6%	(.237)	27.0%	(.007)
Daily interactions	Mostly ME	15.7%	6.369	19.3%	.968
	Mostly non-M.E.	16.0%	(.041)	16.8%	(.616)
	Equal mix of both	26.2%		21.6%	
Health Insurance	No	20.0%	.020	30.8%	2.302
	Yes	21.2%	(.887)	18.6%	(.129)
Have Health Care Provider (HCP)	No	28.6%	4.983	22.1%	.671
	Yes	18.3%	(.026)	18.5%	(.413)
Have seen HCP past 12 months	No	22.3%	.123	22.6%	.821
	Yes	20.7%	(.726)	18.6%	(.365)
Have Gynecologist / Access to WHC	No	20.4%	.101	20.2%	.072
	Yes	21.2%	(.751)	19.1%	(.788)
Ever unable to visit Gyn/WHC past 12 months	No	21.1%	.088	19.3%	1.090
	Yes	23.8%	(.766)	28.6%	(.297)
Health info internet	No	24.8%	2.298	13.8%	5.449
	Yes	18.5%	(.130)	23.3%	(.020)
Health info family/friends	No	19.8%	.123	25.2%	2.984
	Yes	21.4%	(.726)	17.5%	(.084)
Health info television	No	21.8%	2.978	19.2%	.579
	Yes	5.3%	(.084)	26.3%	(.447)

Note. ME=Middle Eastern

The bivariate analysis also included independent samples t-tests, as shown in Table 6 to examine the differences in continuous predictors (age and sociocultural factors) by reported cigarette smoking status (yes vs. no) as well as by Hookah smoking status (yes vs. no). Statistically significant differences were found in the participants' scores on acculturation-heritage scale, perceived stress scale, and beliefs toward sexuality. Participants who reported cigarette smoking had significantly lower levels of acculturation-heritage $t(381) = -3.578, p < 0.001$, lower perceived stress scale scores $t(382) = 2.80, p = 0.005$, and lower levels of beliefs toward sexuality scores $t(364) =$

3.594, $p < 0.001$. Regarding Hookah smoking, statistically significant differences were found in the participants' scores on acculturation-heritage scale and perceived stress scale. Participants who reported Hookah smoking had significantly higher levels of acculturation-heritage $t(377) = 2.826, p = 0.005$ and higher perceived stress scale scores $t(386) = -3.116, p = .002$.

Table 6

Bivariate analysis of the associations between Smoking and Demographic and Sociocultural Factors (continuous predictors), using t-test

Variables	Cigarette Smoking			Hookah Smoking		
	No	Yes	t(p)	No	Yes	t(p)
	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	
Age	21.07 (4.78)	20.42 (2.75)	1.189 (.235)	20.94 (4.73)	20.90 (2.76)	.076 (.940)
Acculturation-Heritage Score	17.20 (6.72)	20.30 (7.62)	-3.578 (< .001)	18.35 (7.19)	15.83 (5.90)	2.826 (.005)
Acculturation-Mainstream	20.20 (6.38)	20.70 (5.86)	-.645 (.519)	20.54 (6.29)	19.53 (6.15)	1.258 (.209)
Perceived Stress Scale Score	8.15 (2.70)	7.21 (2.76)	2.80 (.005)	7.75 (2.78)	8.82 (2.33)	-3.116 (.002)
Social Support	17.56 (2.67)	17.40 (2.76)	.479 (.632)	17.56 (2.67)	17.40 (2.80)	.530 (.596)
Perceived Discrimination	28.94 (7.05)	29.28 (6.91)	-.391 (.696)	28.96 (7.09)	29.41 (6.68)	-.494 (.622)
Attitudes Toward Women	45.47 (9.64)	45.90 (9.97)	-.350 (.727)	45.10 (9.83)	47.15 (8.92)	-1.626 (.105)
Beliefs Toward Sexuality	22.59 (4.55)	20.55 (4.44)	3.594 (< .001)	22.03 (4.74)	22.73 (3.99)	-1.163 (.246)
Religiosity	13.61 (2.83)	13.23 (2.34)	1.115 (.266)	13.66 (2.73)	13.08 (2.67)	1.642 (.101)

Using multivariate analysis, we examined the predictors of cigarette smoking, including the individual, sociocultural, and access to care factors, as shown in Table 7. In the first predictive model, individual factors explained somewhere between 4.9% and 7.5% of the variability in cigarette smoking $X^2(15, N = 320) = 15.939, p = .386$. None of the individual predictors were significantly associated with cigarette smoking.

In the second predictive model, sociocultural factors explained somewhere

between 7.5% and 11.4% of the variability in cigarette smoking $X^2 (8, N=327) = 25.649$, $p = .001$. In this model, cigarette smoking among Middle Eastern college women was significantly associated with the acculturation-heritage ($p = .040$) and beliefs toward sexuality ($p = .012$). The odds of cigarette smoking were 5% higher with lower levels of acculturation - heritage ($aOR: 1.051$; 95% $CI: 1.002 - 1.101$) and 11% lower among with those with higher scores on beliefs toward sexuality ($aOR: .890$; 95% $CI: .813 - .975$). Cigarette smoking was not significantly associated with the remaining predictors tested in this model.

In the third predictive model, access to healthcare factors accounted for 2.6% and 4.0% of the variability in cigarette smoking $X^2 (6, N= 383) = 10.005$, $p = .124$. Cigarette smoking was statistically associated with having a healthcare provider ($p = .046$). The odds of cigarette smoking were 45% lower among Middle Eastern college women who reported having a healthcare provider ($aOR: .553$; 95% $CI: .308 - .990$). Cigarette smoking was not significantly associated with the remaining predictors tested in this model.

Table 7

Logistic regression analysis of predictors - cigarette smoking

<div><div></div><div>Predictors</div></div>	Criterion Variables	Cigarette Smoking						
		B	SE	Wald	df	Sig.	Exp(B)	95% CI
Individual Predictors (N=320)								
Age (<i>M=21</i>)		-.076	.056	1.828	1	.176	.927	.830-1.035
US born (<i>Yes vs. No</i>)		.031	.370	.007	1	.934	1.031	.500-2.128
Parents reside in NJ (<i>Yes vs. No</i>)		-.439	.342	1.644	1	.200	.645	.330-1.261
Student attendance status: (<i>Full time vs. Part time</i>)		.057	.520	.012	1	.913	1.059	.382-2.933
Student enrollment status (<i>Under Graduate vs. Graduate</i>)		-.451	.528	.732	1	.392	.637	.226-1.791
Full time work status (<i>Yes vs. No</i>)		.513	.506	1.029	1	.310	1.670.	620-4.501

Single status (Yes vs. No)	-.625	.334	3.496	1	.062	.535	.278-1.031
Mother attended college: (Yes vs. No)	-.105	.306	.117	1	.732	.901	.494-1.642
Father attended college: (Yes vs. No)	-.030	.455	.004	1	.948	.971	.398-2.367
Immigrated to US-education: (Yes vs. No)	-.115	.301	.146	1	.702	.891	.494-1.608
Immigrated to US-socioeconomic: (Yes vs. No)	-.807	.322	.073	1	.788	.917	.487-1.725
Religion (Christian vs. Muslim)	-.147	.320	.210	1	.647	.864	.461-1.617
Belongs to student organizations (Yes vs. No)	-.253	.327	.597	1	.440	.776	.409-1.475
Belongs to religious organizations (Yes vs. No)	-.162	.309	.276	1	.599	.850	.464-1.558
Daily interactions (mostly ME, Mostly non-ME, an equal mix of both)	.324	.185	3.058	1	.080	1.383	.962-1.990
Constant	1.219	1.543	.624	1	.429	3.385	
Omnibus Tests of Model Coefficients	Chi-square=15.939; df=15; P=.386						
Model Summary	-2 Log likelihood=315.101; Cox & Snell R ² =4.9%; Nagelkerke R ² =7.5%						
Sociocultural Predictors (N=327)							
Acculturation - Heritage	.049	.024	4.210	1	.040	1.051	1.002-1.101
Acculturation - Mainstream	.004	.030	.019	1	.891	1.004	.947-1.065
Perceived Stress	-.090	.067	1.790	1	.181	.914	.802-1.043
Social Support	-.086	.065	1.769	1	.184	.918	.809-1.041
Perceived Discrimination	.039	.027	2.079	1	.149	1.040	.986-1.097
Attitude Towards Women	-.014	.025	.307	1	.579	.986	.939-1.036
Beliefs Toward Sexuality	-.116	.046	6.293	1	.012	.890	.813-.975
Religiosity	.054	.064	.701	1	.403	1.055	.930-1.198
Constant	1.286	2.693	.228	1	.633	3.620	
Omnibus Tests of Model Coefficients	Chi-square=25.649; df=8; P=.001						
Model Summary	-2 Log likelihood=331.308; Cox & Snell R ² =7.5%; Nagelkerke R ² =11.4%						
Access to Healthcare (N=383)							
Health Insurance (Yes vs. No)	.084	.542	.024	1	.877	1.088	.376-3.149
Have Healthcare Provider (HCP) (Yes vs. No)	-.593	.297	3.979	1	.046	.553	.308-.990
Have seen HCP in past 12 months (Yes vs. No)	.193	.319	.386	1	.544	1.213	.649-2.267
Obtain health information from Internet (Yes vs. No)	-2.62	.279	.884	1	.347	.769	.446-1.329
Obtain health information from family/friends (Yes vs. No)	.169	.326	.270	1	.603	1.185	.625-2.245
Obtain health information from television (Yes vs. No)	-1.370	1.047	1.711	1	.191	.254	.033-1.980
Constant	-1.055	.589	3.205	1	.073	.348	
Omnibus Tests of Model Coefficients	Chi-square=10.005; df=6; P=.124						
Model Summary	-2 Log likelihood=387.807; Cox & Snell R ² =2.6%; Nagelkerke R ² =4.0%						

Note. ME=Middle Eastern

Using multivariate analysis, we examined the predictors of hookah smoking, including the individual, sociocultural and access to care factors, as shown in Table 8. In the first predictive model, individual factors explained somewhere between 11.2% and 17.6% of the variability in hookah smoking $X^2 (15, N= 324) = 38.619, p = .001$. In this model, hookah smoking was statistically associated with place of birth ($p = .014$), student attendance ($p = .045$), religion ($p = .022$), belonging to student organizations ($p = .013$), and daily interactions with Middle Eastern and/or non-Middle Eastern students ($p = .048$). The odds of hookah smoking were over 2 times higher among Muslim students ($aOR: 2.405; 95\% CI: 1.135 - 5.097$) as well as those who reported belonging to student organizations ($aOR: 2.242; 95\% CI: 1.185 - 4.240$). Further, the odds of hookah smoking were 45 % higher among students who reporting daily interactions with equal mix of Middle Eastern and non-Middle Eastern students ($aOR: 1.448; 95\% CI: 1.003 - 2.092$). In contrast, the odds of hookah smoking were 60% lower for those who reported having been born in the US ($aOR: .401; 95\% CI: .194 - .829$), and 74% lower among part-time students ($aOR: .256; 95\% CI: .067 - .971$). Hookah smoking was not significantly associated with the remaining predictors tested in this model.

In the second predictive model, sociocultural factors explained somewhere between 6.8% and 10.8% of the variability in hookah smoking $X^2 (8, N= 331) = 23.430, p = .003$. In this model, hookah smoking was statistically associated with scores for acculturation-heritage ($p = .027$) and religiosity ($p = .042$). The odds of hookah smoking were 6.4% lower with lower levels of acculturation-heritage ($aOR: .936; 95\% CI: .882 - .992$) and 13% lower with higher religiosity scores ($aOR: .869; 95\% CI: .759 - .995$). Hookah smoking was not significantly associated with the remaining predictors tested in

this model.

In the third predictive model, access to healthcare predictors explained somewhere between 2.3% and 3.7% of the variability in hookah smoking χ^2 (6, N= 327) = 8.984, $p = .175$. Hookah smoking was not significantly associated with any of the predictors tested in this model.

Table 8

Logistic regression analysis of predictors of hookah smoking

Predictors	Criterion Variables	Hookah Smoking					
	B	SE	Wald	df	Sig.	Exp(B)	95% CI
Individual Predictors (N=324)							
Age (<i>M=21</i>)	.032	.043	.558	1	.455	1.033	.949-1.124
US born (<i>Yes vs. No</i>)	-.915	.371	6.073	1	.014	.401	.194-.829
Parents reside in NJ (<i>Yes vs. No</i>)	.799	.411	3.766	1	.052	2.223	.993-4.978
Student attendance status: (<i>Full time vs. Part time</i>)	-1.363	.680	4.016	1	.045	.256	.067-.971
Student enrollment status (<i>Under Graduate vs. Graduate</i>)	-.341	.494	.475	1	.490	.711	.270-1.874
Full time work status (<i>Yes vs. No</i>)	.760	.521	2.131	1	.144	2.139	.771-5.937
Single status (<i>Yes vs. No</i>)	.240	.381	.397	1	.528	1.272	.602-2.686
Mother attended college: (<i>Yes vs. No</i>)	-.301	.325	.858	1	.354	.740	.392-1.399
Father attended college: (<i>Yes vs. No</i>)	.156	.434	.129	1	.720	1.169	.499-2.738
Immigrated to US-education: (<i>Yes vs. No</i>)	-.180	.313	.332	1	.564	.835	.452-1.541
Immigrated to US-socioeconomic: (<i>Yes vs. No</i>)	.002	.316	.000	1	.966	1.002	.539-1.862
Religion (<i>Christian vs. Muslim</i>)	.878	.383	5.248	1	.022	2.405	1.135-5.097
Belongs to student organizations (<i>Yes vs. No</i>)	.807	.325	6.162	1	.013	2.242	1.185-4.240
Belongs to religious organizations (<i>Yes vs. No</i>)	.549	.305	3.235	1	.072	1.731	.952-3.148
Daily interactions (<i>mostly ME, Mostly non-ME, an equal mix of both</i>)	.371	.187	3.906	1	.048	1.448	1.003-2.092
Constant	-3.130	1.568	3.983	1	.046	.044	
Omnibus Tests of Model Coefficients	Chi-square=38.619; df=15; P=.001						
Model Summary	-2 Log likelihood=291.649; Cox & Snell R ² =11.2%; Nagelkerke R ² =17.6%						
Sociocultural Predictors (N=331)							
Acculturation - Heritage	-.067	.030	4.900	1	.027	.936	.882-.992

Acculturation - Mainstream	.019	.030	.390	1	.532	1.019	.960-1.081
Perceived Stress	.089	.066	1.802	1	.180	1.093	.960-1.244
Social Support	.050	.064	.601	1	.438	1.051	.927-1.191
Perceived Discrimination	.024	.027	.831	1	.362	1.025	.972-1.080
Attitude Towards Women	.046	.025	3.354	1	.067	1.047	.997-1.100
Beliefs Toward Sexuality	.058	.045	1.647	1	.199	1.060	.970-1.157
Religiosity	.141	.069	4.150	1	.042	.869	.759-.995
Constant	-4.469	2.647	2.850	1	.091	.011	
Omnibus Tests of Model Coefficients	Chi-square=23.430; df=8; P=.003						
Model Summary	-2 Log likelihood=310.042; Cox & Snell R ² =6.8%; Nagelkerke R ² =10.8%						
Access to Healthcare (N=387)							
Health Insurance (Yes vs. No)	-.576	.470	1.501	1	.220	.562	.224-1.412
Have Healthcare Provider (HCP) (Yes vs. No)	-.209	.318	.433	1	.510	.811	.435-1.512
Have seen HCP in past 12 months (Yes vs. No)	-.102	.323	.100	1	.752	.903	.479-1.702
Obtain health information from Internet (Yes vs. No)	.474	.309	2.351	1	.125	1.606	.877-2.942
Obtain health information from family/friends (Yes vs. No)	-.365	.307	1.412	1	.235	.694	.380-1.268
Obtain health information from television (Yes vs. No)	.190	.601	.100	1	.752	1.210	.372-3.931
Constant	-.736	.537	1.879	1	.170	.479	
Omnibus Tests of Model Coefficients	Chi-square=8.984; df=6; P=.175						
Model Summary	-2 Log likelihood=371.580; Cox & Snell R ² =2.3%; Nagelkerke R ² =3.7%						

Note. ME=Middle Eastern

Cervical Cancer Screening

In this study, 24% of students reported ever having had a Pap test, among the 70% who reported having the test within the past year. Regarding HPV test, 16% reported ever having had the test. Chi-square tests were used to examine the bivariate associations between cervical cancer screening and the categorical predictors, as shown in Table 9.

Ever had a Pap test is significantly associated with parent's living in New Jersey, student attendance status, student status, full-time work, marital status, father's education, belonging to student and religious organizations, reported daily interactions, having a gynecologist or access to a women's health clinic, and with source of health information. Ever had pap test is higher among students whose parents do not live in New Jersey X^2

(1, N=395)= 4.987, $p = .026$, whose father did not have college education X^2 (1, N=394)= 3.998, $p = .046$, and among those who were part-time students X^2 (1, N=385)= 73.9 $p < .001$, graduate students X^2 (1, N=377)= 56.063, $p < .001$, working full-time X^2 (1, N=396)= 61.875, $p < .001$, and married X^2 (1, N= 395)= 52.944 $p < .001$. In addition, it was significantly higher among students who reported not belonging to student X^2 (1, N=398)= 14.251, $p < .001$, and religious organizations X^2 (1, N=398)= 7.228, $p = .007$, and among those who interacted daily with mostly non-Middle Eastern students X^2 (2, N=389)= 9.149, $p < .001$, among those who had access to a gynecologist or access to a woman's health center X^2 (1, N=383)= 66.749, $p = .001$, and those who obtained health information from the internet X^2 (1, N=398)= 6.658, $p = .010$.

Having had a Pap test in the past year is significantly associated with student's country of birth, work status, reported daily interactions, having health insurance, having seen a healthcare provider in the past twelve months, and having a gynecologist or access to a women's healthcare center. Having Pap test in past year is higher among 77% students born in the US X^2 (1, N=95)= 7.788, $p = .005$, working full-time work X^2 (1, N=95)= 6.963, $p = .008$, daily interaction with equal of Middle Eastern and non-Middle Eastern students X^2 (2, N=94)= 8.226, $p = .016$, and having health insurance X^2 (1, N=94)= 6.271, $p = .012$, have seen a healthcare provider in the past 12 months X^2 (1, N=92)= 16.995 $p < .001$ and those who have access to a gynecologist or women' health center X^2 (1, N= 92)= 13.491, $p < .001$.

Ever having HPV test is significantly associated with student status, student attendance status, full-time work, single status, father's education, belonging to student and religious organizations, reported daily interactions, having access to a gynecologist

or women's health center, and obtaining health information from the Internet. Having had HPV test is higher among part-time students $X^2 (2, N=390)= 56.416, p <.001$, graduate students $X^2 (2, N=382)= 32.753, p <.001, X^2= 32.753; p= <.001$, students working full-time $X^2 (2, N=401)= 72.621, p <.001$, married students $X^2 (2, N=400)= 39.070, p <.001$, students whose father did not attend college $X^2 (1, N=399)= 3.998, p= .046$, students who did not belong to student religious organizations $X^2 (2, N=403)= 6.377, p= .041$, students who interacted daily with mostly non-Middle Eastern students $X^2 (4, N=394)= 25.118, p <.001$, and those who had a gynecologist or access to a women's health center $X^2 (1, N=388)= 51.610, p <.001$, and those who obtain health information from the Internet $X^2 (2, N=403)= 8.520, p= .014$.

Table 9

Bivariate analysis of the associations between cervical cancer screening and the categorical study predictors, using chi-square

Variable	Categories	Ever had Pap Test		Pap Test in Past Year		Ever had HPV test	
		%	X ² (P)	%	X ² (P)	%	X ² (P)
US born	No	23.0%	2.299	76.7%	7.788	15.6%	.423
	Yes	31.5%	(.129)	45.5%	(.005)	18.7%	(.809)
Parents live in NJ	No	32.1%	4.987	61.8%	1.484	20.8%	2.674
	Yes	21.3%	(.026)	73.8%	(.223)	14.5%	(.266)
Student attendance status	Full time	17.0%	73.9	62.5%	2.871	10.8%	56.416
	Part time	70.9%	(< .001)	78.9%	(.090)	50.9%	(< .001)
Student status	Undergrad	17.2%	56.063	71.2%	.153	11.4%	32.753
	Graduate	59.5%	(< .001)	67.4%	(.696)	38.7%	(< .001)
Full-time work	No	16.7%	61.875	60.0%	6.963	9.3%	72.621
	Yes	62.1%	(< .001)	85.0%	(.008)	51.5%	(< .001)
Single	No	47.9%	52.944	72.4%	.255	33.6%	39.070
	Yes	13.9%	(< .001)	67.6%	(.613)	8.6%	(< .001)
Mother_college	No	25.2%	.233	60.0%	3.264	14.4%	1.104
	Yes	23%	(.629)	77.4%	(.071)	16.9%	(.576)
Father_college	No	34.5%	3.998	60.0%	1.267	23.0%	3.998
	Yes	22.3%	(.046)	73.0%	(.260)	14.8%	(.046)
Immigrated to US education	No	25.3%	.137	67.4%	.204	16.8%	1.010
	Yes	23.7%	(.711)	71.7%	(.652)	15.7%	(.603)

Immigrated to US socioeconomic	No	23.8%	.043	75.8%	.849	17.2%	1.204
	Yes	24.7%	(.836)	66.7%	(.357)	15.5%	(.548)
Religion	Christian	28.3%	1.948	74.3%	.682	18.9%	2.523
	Muslim	21.9%	(.163)	66.1%	(.409)	14.2%	(.283)
Belongs to Student Organizations	No	30.6%	14.251	69.7%	.001	20.6%	12.090
	Yes	13.7%	(< .001)	70.0%	(.982)	8.2%	(.002)
Belongs to Relig. Organizations	No	28.5%	7.228	71.6%	.513	18.8%	6.377
	Yes	16.3%	(.007)	63.6%	(.474)	10.9%	(.041)
Daily interactions	Mostly ME	9.2%	19.149	30.0%	8.226	1.8%	25.118
	Mostly non-M.E.	31.3%	(< .001)	71.0%	(.016)	22.0%	(< .001)
	Equal mix of both	29.8%		75.5%		2.6%	
Health Insurance	No	28.0%	.199	28.6%	6.271	11.5%	1.765
	Yes	24.0%	(.655)	73.6%	(.021)	16.5%	(.414)
Have Health Care Provider (HCP)	No	15.5%	6.681	56.3%	1.797	66.4%	5.960
	Yes	28.0%	(.010)	73.1%	(.180)	61.6%	(.051)
Have seen HCP past 12 months	No	19.4%	1.766	31.6%	16.995	11.3%	3.582
	Yes	26.0%	(.184)	80.0%	(<.001)	17.5%	(.167)
Have Gynecologist /Access to WHC	No	5.4%	66.749	20.0%	13.491	2.1%	51.610
	Yes	40.9%	(<.001)	76.2%	(<.001)	28.2%	(<.001)
Ever unable to visit Gyn/WHC past 12 months	No	24.7%	.340	70.0%	.046	16.0%	.162
	Yes	19.0%	(.560)	75%	(.831)	14.3%	(.922)
Health info internet	No	17.4%	6.658	55.6%	3.611	9.5%	8.520
	Yes	28.8%	(.010)	75.4%	(.057)	20.4%	(.014)
Health info family/friends	No	29.2%	1.862	71.0%	.030	20.8%	2.946
	Yes	22.6%	(.172)	69.2%	(.862)	14.5%	(.229)
Health info television	No	24.3%	.041	69.2%	.261	15.6%	1.610
	Yes	26.3%	(.840)	80.0%	(.610)	26.3%	(.447)

Note: ME=Middle Eastern

The bivariate analysis also included independent samples t-tests, as shown in Table 10 to examine the differences in continuous predictors (age and sociocultural factors) by reported cervical cancer screening (for each of three outcomes - yes vs. no). Regarding ever having a Pap test, statistically significant differences were found in the participants' age, acculturation-heritage score, acculturation mainstream score, perceived discrimination scale, attitudes toward women, beliefs toward sexuality, and religiosity. Participants who reported ever having a Pap test were older $t(380) = -11.320, p < 0.001$ and had significantly lower levels of acculturation-heritage $t(372) = -3.642, p < 0.001$ higher levels of acculturation-mainstream $t(370) = 3.909, p < 0.001$, lower perceived discrimination score $t(379) = 2.558, p = 0.011$, higher attitude towards women score

$t(358) = -4.259, p < 0.001$, and lower beliefs toward sexuality scores $t(363) = 4.462, p < 0.001$, and lower religiosity scores $t(373) = 2.839, p = .005$.

Regarding having a Pap test in the past year, statistically significant differences were found in the acculturation-heritage score, perceived discrimination scale, attitudes towards women score, beliefs toward sexuality score, and religiosity score. Participants who reported having had a Pap test in the past year had significantly lower levels of acculturation-heritage $t(89) = -3.470, p \leq 0.001$, lower perceived discrimination score $t(89) = 3.016, p = 0.003$, lower attitudes toward women score $t(83) = -3.939, p < 0.001$, lower beliefs toward sexuality score $t(84) = 4.241, p < 0.001$, and lower religiosity score $t(87) = 2.442, p = 0.17$.

Regarding having HPV test, statistically significant differences were found in the participants' age, acculturation-heritage score, acculturation mainstream score, perceived discrimination score, attitudes toward women score. Participants who reported having had HPV test were older $t(305) = 8.656, p < 0.001$, and had significantly lower levels of acculturation-heritage $t(297) = 4.561, p < 0.001$, higher levels of acculturation mainstream $t(294) = -3.849, p < 0.001$, lower perceived discrimination score $t(300) = -5.205, p < 0.001$, higher attitudes towards women score $t(285) = 4.754, p < 0.001$, lower beliefs toward sexuality score $t(287) = -6.225, p < 0.001$, and lower religiosity score $t(295) = -4.947, p < 0.001$.

Table 10

Bivariate analysis of the associations between cervical cancer screening and demographic and sociocultural factors (continuous predictors), using t-test

Variables	Ever had a Pap Test			Pap Test in Past year			Ever had HPV Test		
	No	Yes	t(p)	No	Yes	t(p)	No	Yes	t(p)

	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	
Age	19.68 (2.02)	24.91 (7.01)	-11.320 (< .001)	26.85 (9.37)	24.13 (5.64)	1.695 (.094)	20.86 (3.31)	24.84 (5.59)	8.656 (< .001)
Acculturation- Heritage Score	17.17 (6.98)	20.21 (6.70)	-3.642 (< .001)	16.67 (5.88)	21.70 (6.50)	3.470 (.001)	16.75 (6.73)	21.17 (6.35)	4.561 (< .001)
Acculturation- Mainstream	20.99 (6.63)	18.03 4.27	3.909 (< .001)	19.17 (5.70)	17.56 (3.55)	1.568 (.121)	20.88 (6.71)	17.34 (3.90)	-3.849 (< .001)
Perceived Stress Scale	7.98 (2.71)	7.85 2.85	.390 (.697)	7.81 (2.66)	7.89 (2.95)	-.115 (.909)	8.07 (2.78)	7.75 (2.80)	-.793 (.429)
Social Support	17.44 (2.75)	17.90 (2.52)	-1.410 (.159)	17.93 (2.13)	17.89 (2.71)	.066 (.948)	17.50 (2.73)	18.12 (2.78)	1.584 (.114)
Perceived Discrimination	29.52 (7.03)	27.38 (6.80)	2.558 (.011)	30.50 (26.02)	7.13 (6.27)	3.016 (.003)	29.87 (6.79)	24.90 (5.88)	-5.205 (< .001)
Attitudes Toward Women	44.42 (9.95)	49.40 (7.66)	-4.259 (< .001)	44.64 (51.30)	9.61 (5.78)	-3.939 (< .001)	44.49 (9.89)	51.09 (6.3)	4.754 (< .001)
Beliefs Toward Sexuality	22.69 (4.42)	20.23 (4.68)	4.462 (< .001)	23.15 (18.92)	4.28 (4.30)	4.241 (< .001)	22.82 (4.45)	18.75 (4.11)	-6.225 (< .001)
Religiosity	13.74 (2.63)	12.81 (2.94)	2.839 (.005)	13.93 (12.33)	1.90 (3.21)	2.442 (.017)	13.85 (2.47)	11.95 (3.21)	-4.947 (< .001)

Using multivariate analysis, the predictors were examined for cervical cancer screening (ever having Pap test), including the individual, sociocultural, and access to care factors, as shown in Table 11. In the first predictive model, individual factors explained somewhere between 36.4% and 54.7% of the variability in ever having a Pap test $X^2 (15, N= 319) = 144.588, p = <.001$. In this model, ever having a Pap test was statistically associated with age ($p = .001$), religion ($p = .017$), and belonging to student organizations ($p = .038$). The odds of ever having a Pap test were 65% higher among Middle Eastern college women who are older than 21 years ($aOR: 1.653; CI: 1.365 - 2.003$). In contrast, the odds of ever having a Pap test were 64% lower among Muslim students ($aOR: .363; 95\% CI: .159 - .832$) and 60% lower among those who report belonging to student organizations ($aOR: .405; 95\% CI: .172 - .953$). Ever having a Pap test was not significantly associated with the remaining predictors tested in this model.

In the second predictive model, sociocultural factors explained somewhere between 10% and 15% of the variability in ever having a Pap test $X^2 (8, N= 326) = 34.311, p = <.001$. In this model, ever having a Pap test was statistically associated with acculturation-heritage ($p = .014$) and acculturation-mainstream ($p = .030$). The odds of ever having a Pap test were 6% higher with lower levels of acculturation-heritage ($aOR: 1.061; 95\% CI: 1.012 - 1.113$) and 7% lower with lower levels of acculturation-mainstream ($aOR: .930; 95\% CI: .870 - .993$). Ever having a Pap test was not significantly associated with the remaining predictors tested in this model.

In the third predictive model, access to healthcare access predictors explained somewhere between 19.3% and 28.8% of the variability in ever having a Pap test $X^2 (6, N= 383) = 81.990, p = <.001$. In this model, ever had a Pap test was statistically associated with having a gynecologist or access to a women's health center ($p < .001$). The odds of ever having a Pap test were over 12 times higher among Middle Eastern college women who reported having a gynecologist or access to a women's health center ($aOR: 12.521; 95\% CI: 6.149 - 25.495$). Ever having a Pap test was not significantly associated with the remaining predictors tested in this model.

Table 11

Logistic regression analysis of predictors ever having a pap test

<div>Predictors</div>	Criterion Variables	Ever had Pap Test						
		B	SE	Wald	df	Sig.	Exp(B)	95% CI
Individual Predictors (N=319)								
Age (<i>M=21</i>)		.503	.098	26.424	1	<.001	1.653	1.365-2.003
US born (<i>Yes vs. No</i>)		.461	.477	.935	1	.334	1.586	.622-4.043
Parents reside in NJ (<i>Yes vs. No</i>)		-.220	.447	.242	1	.623	.802	.334-1.927
Student attendance status: (<i>Full time vs. Part time</i>)		.848	.605	1.962	1	.161	2.334	.713-7.641

Student enrollment status (<i>Under Graduate vs. Graduate</i>)	-.319	.581	.302	1	.583	.727	.233-2.271
Full time work status (<i>Yes vs. No</i>)	.752	.591	.1.620	1	.203	2.122	.666-6.761
Single status (<i>Yes vs. No</i>)	-.485	.393	1.523	1	.217	.616	.285-1.330
Mother attended college: (<i>Yes vs. No</i>)	.011	.392	.001	1	.977	1.011	.469-2183
Father attended college: (<i>Yes vs. No</i>)	-3.25	.542	.361	1	.548	.722	.250-2.088
Immigrated to US-education: (<i>Yes vs. No</i>)	.002	.385	.000	1	.996	1.002	.471-2.130
Immigrated to US-socioeconomic: (<i>Yes vs. No</i>)	.057	.418	.019	1	.892	1.059	.466-2.403
Religion (<i>Christian vs. Muslim</i>)	-1.013	.423	5.734	1	.017	.363	.159-.832
Belongs to student organizations (<i>Yes vs. No</i>)	-.903	.436	4.287	1	.038	.405	.172-.953
Belongs to religious organizations (<i>Yes vs. No</i>)	-.557	.418	1.775	1	.183	.573	2.52-1.300
Daily interactions (<i>mostly ME, Mostly non-ME, an equal mix of both</i>)	.391	.247	2.495	1	.114	1.478	.910-2.399
Constant	-11.078	2.142	26.757	1	<.001	.000	
Omnibus Tests of Model Coefficients	Chi-square=144.588; df=15; P<.001						
Model Summary	-2 Log likelihood=205.705; Cox & Snell R ² =36.4%; Nagelkerke R ² =54.7%						
Sociocultural Predictors (N=326)							
Acculturation - Heritage	.060	.024	6.018	1	.014	1.061	1.012-1.113
Acculturation - Mainstream	-.073	.034	4.726	1	.030	.930	.870-.993
Perceived Stress	.063	.065	.940	1	.332	1.065	.938-1.209
Social Support	.082	.066	1.530	1	.216	1.085	.953-1.235
Perceived Discrimination	.010	.026	.157	1	.691	1.010	.960-1.063
Attitude Towards Women	.001	.026	.002	1	.966	1.001	.952-1.053
Beliefs Toward Sexuality	-.071	.043	2.670	1	.102	.932	.856-1.014
Religiosity	.001	.061	.000	1	.985	1.001	.888-1.129
Constant	-1.74	2.632	.404	1	.525	.188	
Omnibus Tests of Model Coefficients	Chi-square=34.311; df=8; P<.001						
Model Summary	-2 Log likelihood=324.439; Cox & Snell R ² =10.0%; Nagelkerke R ² =15.0%						
Access to Healthcare (N=383)							
Health Insurance (<i>Yes vs. No</i>)	-.682	.560	1.483	1	.223	.506	.169-1.515
Have gynecologist or access to women's health center (WHC) (<i>Yes vs. No</i>)	2.527	.363	48.526	1	<.001	12.521	6.149-25.495
Not being able to access a gynecologist or WHC in past year (<i>Yes vs. No</i>)	-.748	.627	1.423	1	.233	.473	.138-1.618
Obtain health information from Internet (<i>Yes vs. No</i>)	.423	.307	1.898	1	.168	1.527	.836-2.790
Obtain health information from family/friends (<i>Yes vs. No</i>)	-.309	.321	.923	1	.337	.734	.391-1.378
Obtain health information from television (<i>Yes vs. No</i>)	-.035	.598	.003	1	.953	.965	.299-3.116

Constant	-2.247	.653	11.840	1	.001	.106	
Omnibus Tests of Model Coefficients	Chi-square=81.990; df=6; P<.001						
Model Summary	-2 Log likelihood=342.611; Cox & Snell R ² =19.3%; Nagelkerke R ² =28.8%						

Note. ME=Middle Eastern

Using multivariate analysis, we examined the predictors for factors that influence cervical cancer screening (having had a Pap test in the past year), including the individual, sociocultural and access to care factors, as shown in Table 12. In the first predictive model, individual factors explained somewhere between 23.7% and 33.5% of the variability in having had a Pap test in the past year $X^2 (15, N= 75) = 20.301, p = .161$. Having had a Pap test in the past year was not significantly associated with any of the individual predictors.

In the second predictive model, sociocultural factors explained somewhere between 28.7% and 42% of the variability in having a Pap test in the past year $X^2 (8, N= 78) = 26.3983, p = .001$. Having a Pap test in the past year was statistically associated with perceived stress ($p = .042$). The odds of having a Pap test in the past year were 37% higher with higher scores of perceived stress ($aOR: 1.371; 95\% CI: 1.012 - 1.858$). Having had a Pap test within the past year was not significantly associated with the remaining predictors tested in this model.

In the third predictive model, access to healthcare predictors explained somewhere between 18.7% and 26.6% of the variability in having had a Pap test in the past year $X^2 (6, N= 92) = 19.004, p = .004$. Having had a Pap test in the past year was statistically associated with having a gynecologist or access to a women's health center ($p = .010$). The odds of having had a Pap test in the past year were over 11 times higher

among Middle Eastern college women who reported having a gynecologist or access to a women's health center (*aOR*: 11.432, 95% *CI*: 1.800 - 72.629). Having had a Pap test in the past year was not significantly associated with the remaining predictors tested in this model.

Table 12

Logistic regression analysis of predictors of having a pap test in the past year

<div><div></div><div>Criterion Variables</div></div> <div>Predictors</div>	Had Pap Test in Past Year						
	B	SE	Wald	df	Sig.	Exp(B)	95% CI
Individual Predictors (N=75)							
Age (<i>M</i> =21)	.008	.062	.017	1	.897	1.008	.893-1.137
US born (<i>Yes vs. No</i>)	1.515	.781	3.767	1	.052	4.550	.985-21.012
Parents reside in NJ (<i>Yes vs. No</i>)	.691	.829	.696	1	.404	1.996	.39-10.129
Student attendance status: (<i>Full time vs. Part time</i>)	.785	.921	.726	1	.394	2.193	.360-13.346
Student enrollment status (<i>Under Graduate vs. Graduate</i>)	-1.078	.944	1.304	1	.253	.340	.054-2.164
Full time work status (<i>Yes vs. No</i>)	1.925	1.047	3.380	1	.066	6.856	.881-53.379
Single status (<i>Yes vs. No</i>)	.769	.748	1.055	1	.304	2.157	.498-9.352
Mother attended college: (<i>Yes vs. No</i>)	.660	.699	.891	1	.345	1.934	.492-7.611
Father attended college: (<i>Yes vs. No</i>)	.083	.925	.008	1	.928	1.087	.177-6.663
Immigrated to US-education: (<i>Yes vs. No</i>)	-.119	.708	.028	1	.866	.888	.221-3.558
Immigrated to US-socioeconomic: (<i>Yes vs. No</i>)	-.575	.762	.569	1	.451	.563	.127-2.505
Religion (<i>Christian vs. Muslim</i>)	-.251	.668	.141	1	.708	.778	.201-2.885
Belongs to student organizations (<i>Yes vs. No</i>)	.614	.902	.462	1	.469	1.847	.315-10.830
Belongs to religious organizations (<i>Yes vs. No</i>)	-.585	.736	.631	1	.427	.557	.132-2.360
Daily interactions (<i>mostly ME, Mostly non-ME, an equal mix of both</i>)	.632	.485	1.698	1	.193	1.881	.727-4.865
Constant	-2.302	3.600	.409	1	.523	.100	
Omnibus Tests of Model Coefficients	Chi-square=20.301; df=15; P<.161						
Model Summary	-2 Log likelihood=72.160; Cox & Snell R ² =23.7%; Nagelkerke R ² =33.5%						
Sociocultural Predictors (N=78)							
Acculturation - Heritage	.139	.073	3.626	1	.057	1.149	.996-1.325
Acculturation - Mainstream	-.052	.095	.297	1	.585	.949	.787-1.145
Perceived Stress	.316	.155	4.144	1	.042	1.371	1.012-1.858

Social Support	-.157	.172	.832	1	.362	.855	.611-1.197
Perceived Discrimination	.040	.058	.469	1	.494	.961	.858-1.077
Attitude Towards Women	.026	.058	.207	1	.649	1.027	.917-1.150
Beliefs Toward Sexuality	-.191	.115	2.755	1	.097	.826	.660-1.035
Religiosity	.055	.143	.147	1	.702	1.056	.798-1.398
Constant	2.756	5.849	.222	1	.637	15.737	
Omnibus Tests of Model Coefficients	Chi-square=26.393; df=8; P=.001						
Model Summary	-2 Log likelihood=64.479; Cox & Snell R ² =.28.7%; Nagelkerke R ² =41.7%						
Access to Healthcare (N=92)							
Health Insurance <i>(Yes vs. No)</i>	1.806	1.313	1.890	1	.169	6.084	.464-79.847
Have gynecologist or access to a women's health center WHC <i>(Yes vs. No)</i>	2.436	.943	6.671	1	.010	11.432	1.800-72.629
Not being able to access a gynecologist or WHC in past year <i>(Yes vs. No)</i>	1.630	1.796	.824	1	.364	5.106	.151-172.590
Obtain health information from Internet <i>(Yes vs. No)</i>	.778	.571	1.860	1	.173	2.178	.712-6.663
Obtain health information from family/friends <i>(Yes vs. No)</i>	-.673	.673	1.003	1	.317	.510	.136-1.905
Obtain health information from television <i>(Yes vs. No)</i>	.093	1.182	.006	1	.937	1.098	.108-1.131
Constant	-3.054	1.467	4.336	1	.037	.047	
Omnibus Tests of Model Coefficients	Chi-square=19.004; df=6; P=.004						
Model Summary	-2 Log likelihood=92.359; Cox & Snell R ² =18.7%; Nagelkerke R ² =26.6%						

Note: ME=Middle Eastern

Using multivariate analysis, we examined the predictors for cervical cancer screening (ever having HPV test), including the individual, sociocultural and access to care factors, as shown in Table 13. In the first predictive model, individual factors explained somewhere between 25.2% and 42.4% of the variability in ever having HPV test $\chi^2 (15, N= 324) = 93.940, p = < .001$. In this model, ever having an HPV test was statistically associated with age ($p = .009$), full time work status ($p = .002$), belonging to student organizations ($p = .043$), and daily interactions with Middle Eastern and non-Middle Eastern students ($p = .038$). The odds of ever having an HPV test were 18% higher among students who are older than 21 years of age ($aOR: 1.180$; 95% $CI: 1.042 - 1.336$), 27% higher among those reporting having full time work ($aOR: 5.270$; 95% $CI:$

1.814 - 15.310), and 79% higher among those who reported daily interactions with mostly non- Middle Eastern students (*aOR*: 1.794; 95% *CI*: 1.032-3.119). In contrast, the odds of having an HPV test were 61% lower in Middle Eastern college women who report belonging to student organizations (*aOR*: .386; 95% *CI*: .154-.969). Ever having an HPV test was not significantly associated with the remaining predictors tested in this model.

In the second predictive model, sociocultural factors explained somewhere between 14.7% and 25.7% of the variability of ever having an HPV test $\chi^2 (8, N= 331) = 52.573, p = <.001$. Ever having an HPV test was statistically associated with acculturation-heritage ($p = .050$), acculturation-mainstream ($p = .044$), and beliefs toward sexuality ($p = .008$). The odds of ever having an HPV test were 6% higher with lower levels of acculturation-heritage (*aOR*: 1.060; 95% *CI*: 1.000 - 1.124). In contrast, the odds of ever having an HPV test were 9% lower with lower levels on acculturation-mainstream (*aOR*: .913; 95% *CI*: .836 - .998) and 14% lower with higher scores on beliefs toward sexuality (*aOR*: .866; 95% *CI*: .778 - .964). Ever having an HPV test was not significantly associated with the remaining predictors tested in this model.

In the third predictive model, access to healthcare predictors explained somewhere between 16.4% and 28.0% of the variability in having an HPV test $\chi^2 (6, N= 388) = 69.403, p = <.001$. Having had an HPV test was statistically associated with having a gynecologist or access to a women's health center ($p < .001$) and obtaining health information from the Internet ($p = .048$). The odds of having an HPV test was about 19 times higher among those who reported having a gynecologist or access to a women's health center (*aOR*: 17.851; 95% *CI*: 6.272 - 50.807) and 2 times higher among

those who reported obtaining health information from the internet (*aOR*: 2.108; 95% *CI*: 1.008 - 4.409). Ever having an HPV test was not significantly associated with the remaining predictors tested in this model.

Table 13

Logistic regression analysis of predictors of ever having an hpv test

Predictors	Criterion Variables	Ever had HPV Test						
		B	SE	Wald	df	Sig.	Exp(B)	95% CI
Individual Predictors (N=324)								
Age (<i>M</i> =21)		.165	.063	6.819	1	.009	1.180	1.042-1.336
US born (<i>Yes vs. No</i>)		.716	.501	2.040	1	.153	2.047	.766-5.469
Parents reside in NJ (<i>Yes vs. No</i>)		.288	.479	.362	1	.547	1.334	.522-3.408
Student attendance status: (<i>Full time vs. Part time</i>)		.321	.568	.319	1	.572	1.378	.453-4.196
Student enrollment status (<i>Under Graduate vs. Graduate</i>)		-.026	.572	.002	1	.964	.974	.318-2.989
Full time work status (<i>Yes vs. No</i>)		1.662	.544	9.332	1	.002	5.270	1.814-15.310
Single status (<i>Yes vs. No</i>)		-.713	.420	2.876	1	.090	.490	.215-1.117
Mother attended college: (<i>Yes vs. No</i>)		.790	.428	3.405	1	.065	2.203	.952-5.098
Father attended college: (<i>Yes vs. No</i>)		-.584	.554	1.111	1	.292	.558	.188-1.652
Immigrated to US-education: (<i>Yes vs. No</i>)		-.204	.392	.270	1	.603	.816	.379-1.758
Immigrated to US-socioeconomic: (<i>Yes vs. No</i>)		-.613	.423	2.097	1	.148	.542	.237-1.242
Religion (<i>Christian vs. Muslim</i>)		-.641	.411	2.431	1	.119	.527	.236-1.179
Belongs to student organizations (<i>Yes vs. No</i>)		-.952	.407	4.111	1	.043	.386	.154-.969
Belongs to religious organizations (<i>Yes vs. No</i>)		-.471	.433	1.182	1	.277	.624	.267-1.460
Daily interactions (<i>mostly ME, Mostly non-ME, an equal mix of both</i>)		.584	.282	4.291	1	.038	1.794	1.032-3.119
Constant		-5.715	1.963	8.478	1	.004	.003	
Omnibus Tests of Model Coefficients	Chi-square=93.940; df=15; P<.001							
Model Summary	-2 Log likelihood=198.024; Cox & Snell R ² =25.2%; Nagelkerke R ² =42.4%							
Sociocultural Predictors (N=331)								
Acculturation - Heritage		.058	.030	3.841	1	.050	1.060	1.000-1.124
Acculturation - Mainstream		-.091	.045	4.051	1	.044	.913	.836-.998
Perceived Stress		.142	.082	2.980	1	.084	1.153	.981-1.355
Social Support		.103	.083	1.531	1	.216	1.108	.942-1.304
Perceived Discrimination		-.062	.032	3.653	1	.056	.940	.882-1.002

Attitude Towards Women	-.030	.035	.759	1	.384	.970	.906-1.039
Beliefs Toward Sexuality	-.144	.055	6.952	1	.008	.866	.778-.964
Religiosity	-.034	.070	.229	1	.632	.967	.843-1.109
Constant	2.419	3.274	.546	1	.460	11.234	
Omnibus Tests of Model Coefficients	Chi-square=52.573; df=8; P<.001						
Model Summary	-2 Log likelihood=228.472; Cox & Snell R ² =14.7%; Nagelkerke R ² =25.7%						
Access to Healthcare (N=388)							
Health Insurance (Yes vs. No)	.116	.699	.028	1	.868	1.123	.285-4.420
Have gynecologist or access to a women's health center WHC (Yes vs. No)	2.882	.534	29.166	1	<.001	17.851	6.272-50.807
Not being able to access a gynecologist or WHC in past year (Yes vs. No)	-.458	.692	.437	1	.509	.633	.163-2.458
Obtain health information from Internet (Yes vs. No)	.746	.377	3.923	1	.048	2.108	1.008-4.409
Obtain health information from family/friends (Yes vs. No)	-.409	.355	1.328	1	.249	.664	.331-1.332
Obtain health information from television (Yes vs. No)	.571	.616	.859	1	.354	1.771	.529-5.926
Constant	-4.150	.890	21.743	1	<.001	.016	
Omnibus Tests of Model Coefficients	Chi-square=69.403; df=6; P<.001						
Model Summary	-2 Log likelihood=271.516; Cox & Snell R ² =16.4%; Nagelkerke R ² =28.0%						

Note. ME=Middle Eastern

Age-Appropriate Immunizations

Three age-appropriate immunizations for college women are Human Papilloma Virus (HPV), meningitis, and influenza vaccinations. In this study, the rates of receiving these vaccines were 30% for the HPV vaccine, 66% for the Flu vaccine, and 61% meningitis vaccine. Chi-square tests were used to examine the bivariate associations between age-appropriate immunizations and the categorical predictors, as shown in Table 14.

Ever had HPV vaccine was significantly associated with country of birth, mother's education, reason for immigration to the US, religion, reported daily interactions, health insurance status, having a healthcare provider, having seen a healthcare provider in the past twelve months, and having access to a gynecologist or

women's health center. Ever having had HPV vaccine is higher among students not born in the US $X^2 (1, N=393)= 11.364, p= .001$, students whose mother's attended college $X^2 (1, N=396)= 12.809, p <.001$, those who immigrated to the US for socio-economic status $X^2 (1, N=401)= 3.893, p= .048$, Christian $X^2 (1, N=386)= 4.031, p= .045$, as well as those who reported daily interactions with an equal mix of Middle Eastern and non-Middle Eastern students $X^2 (2, N=392)= 28.085, p <.001$, those whom have health insurance $X^2 (1, N=394)= 5.490, p= .019$, those who had a healthcare provider $X^2 (1, N=386)= 25.349, p <.001$, those who saw a healthcare provider in the past twelve months $X^2 (1, N= 386)= 9.613, p= .002$, and those who had access to a gynecologist or women's health center $X^2 (1, N=386)= 15.932, p <.001$.

Ever had Meningitis vaccine was significantly associated with country of birth, parent' s residence, student attendance status, full-time work, single status, and mother's education, belonging to student organizations, reported daily interactions, having a healthcare provider, having seen a healthcare provider in the past twelve months, and obtaining health information from the internet.

Ever having Meningitis vaccine was higher among students not born in the US $X^2 (1, N=392)= 14.361, p <.001$, those whose parent's live in New Jersey $X^2 (1, N=397)= 4.330, p= .037$, full-time students $X^2 (1, N=387)= 15.182, p <.001$, those not working full-time $X^2 (1, N=398)= 7.115, p= .008$, single $X^2 (1, N=397)= 7.564, p= .006$, those whose mother's attended college $X^2 (1, N=395)= 14.662, p <.001$, those who reported belonging to student organizations $X^2 (1, N=400)= 14.485, p <.001$, interacting daily with an equal mix of Middle Eastern and non-Middle Eastern students $X^2 (2, N=391)= 6.069, p= .048$, as well as, those who

had a healthcare provider $X^2 (1, N=384)= 24.672, p <.001$, those who have seen a healthcare provider in the past twelve months $X^2 (1, N=384)= 20.820, p <.001$, and those whom obtained health information from the internet $X^2 (1, N=400)= 15.235, p <.001$.

Having had flu vaccine in the past 12 months was significantly associated with student attendance status, full-time work, father's education, reason for immigration to the US, religion, belonging to religious organizations, reported daily interactions, health insurance status, having seen a healthcare provider in the past twelve months, and obtaining health information from the Internet.

Having had flu vaccine in the past 12 months is higher among full-time students $X^2 (1, N=389)= 9.780, p= .002$, those working full-time $X^2 (1, N=400)= 8.707, p= .003$, student's whose father's attended college $X^2 (1, N=398)= 5.493, p= .019$, those whom have immigrated to the US for socio-economic reasons $X^2 (1, N=402)= 16.546, p <.001$, Christian $X^2 (1, N=387)= 15.108, p <.001$, those whom belong to religious organizations $X^2 (1, N=402)= 5.243, p= .022$, those who report daily interactions with mostly Middle Eastern students $X^2 (2, N=393)= 6.423, p= .040$, having health insurance $X^2 (1, N=395)= 19.034, p <.001$, those who visited a healthcare provider in the past twelve months $X^2 (1, N=386)= 29.170, p <.001$, and those who did not obtain health information from the Internet $X^2 (1, N=402)= 4.539, p= .033$

Table 14

Bivariate analysis of the associations between vaccines (age-appropriate) and the categorical study predictors, using chi-square

Variable	Categories	Received HPV Vaccine		Received Meningitis Vaccine		Received Flu Vaccine past 12 months	
		%	X ² (P)	%	X ² (P)	%	X ² (P)
US born	No	40.9%	11.364	65.7%	14.36	67.1%	1.904
	Yes	20.0%	(.001)	41.9%	(< .001)	58.7%	(.168)
Parents live in NJ	No	30.0%	3.361	52.7%	4.330	60.9%	1.362
	Yes	39.9%	(.067)	64.1%	(.037)	67.1%	(.243)
Student attendance status	Full time	36.0%	1.303	65.8%	15.182	68.7%	9.780
	Part time	43.9%	(.254)	38.6%	(< .001)	47.4%	(.002)
Student status	Undergrad	34.8%	1.630	63.8%	2.798	66.7%	2.996
	Graduate	42.7%	(.202)	53.3%	(.094)	56.0%	(.083)
Full-time work	No	35.1%	3.306	64.5%	7.115	68.9%	8.707
	Yes	47.0%	(.069)	47.0%	(.008)	50.0%	(.003)
Single	No	41.0%	1.086	51.6%	7.564	60.7%	2.163
	Yes	35.5%	(.297)	66.2%	(.006)	68.2%	(.141)
Mother_college	No	26.9%	12.809	50.3%	14.662	63.5%	.397
	Yes	44.5%	(< .001)	69.3%	(< .001)	66.5%	(.529)
Father_college	No	29.5%	1.748	59.0%	.206	52.5%	5.493
	Yes	38.4%	(.186)	62.1%	(.650)	68.0%	(.019)
Immigrated to US education	No	40.5%	1.651	64.5%	1.372	64.7%	.117
	Yes	34.2%	(.199)	58.8%	(.241)	66.4%	(.732)
Immigrated to US socioeconomic	No	30.6%	3.893	56.9%	1.757	52.8%	16.546
	Yes	40.5%	(.048)	63.7%	(.185)	72.9%	(< .001)
Religion	Christian	44.1%	4.031	64.6%	1.299	79.5%	15.108
	Muslim	33.6%	(.045)	58.5%	(.254)	59.6%	(< .001)
Belongs to Student Organizations	No	33.5%	3.647	54.3%	14.485	68.1%	1.854
	Yes	43.1%	(.056)	73.6%	(< .001)	61.4%	(.173)
Belongs to Relig. Organizations	No	39.1%	1.627	60.6%	.136	69.5%	5.243
	Yes	32.6%	(.202)	62.5%	(.713)	58.1%	(.022)
Daily interactions	Mostly ME	16.8%	25.085	51.4%	6.069	69.4%	6.423
	Mostly non-M.E.	41.0%	(< .001)	63.0%	(.048)	55.0%	(.040)
	Equal mix of both	45.4%		65.8%		68.6%	
Health Insurance	No	15.4%	5.490	46.2%	2.799	26.9%	19.034
	Yes	38.3%	(.019)	62.7%	(.094)	58.8%	(< .001)
Have Health Care Provider (HCP)	No	17.7%	25.349	42.5%	24.672	63.7%	.263
	Yes	44.8%	(< .001)	69.4%	(< .001)	66.4%	(.608)
Have seen HCP past 12 months	No	24.5%	9.613	42.9%	20.820	44.3%	29.170
	Yes	41.5%	(.002)	68.2%	(< .001)	73.4%	(< .001)
Have Gynecologist /Access to WHC	No	26.7%	15.932	58.1%	1.675	69.0%	1.740
	Yes	46.2%	(< .001)	64.4%	(.196)	62.7%	(.187)
Ever unable to visit Gyn/WHC past 12 months	No	36.8%	.105	60.4%	2.093	66.2%	1.684
	Yes	33.3%	.746	76.2%	(.148)	52.4%	(.194)
Health info internet	No	32.5%	2.168	49.4%	15.235	72.0%	4.539
	Yes	39.8%	(.141)	68.9%	(< .001)	61.6%	(.033)
Health info	No	36.8%	.001	63.2%	.233	61.3%	1.209

family/friends	Yes	36.9%	(.977)	60.5%	(.629)	67.2%	(.272)
Health info	No	36.4%	.937	60.9%	.432	66.3%	1.504
television	Yes	47.4%	(.333)	68.4%	(.511)	52.6%	(.220)

Note: ME=Middle Eastern

Bivariate analysis also included independent samples t-tests as shown in Table 15 to examine the differences in continuous predictors (age and sociocultural factors) by reported ever having received HPV vaccine (yes vs. no). Statistically significant differences were found in acculturation-heritage score, acculturation mainstream score, perceived stress scale perceived, social support, perceived discrimination score, attitudes toward women score, belief towards sexuality, and religiosity. Participants who reported having had HPV vaccine had significantly lower level of acculturation-heritage $t(375) = -4.850, p < 0.001$, higher level of acculturation mainstream $t(373) = 4.890, p < 0.001$, lower perceived stress score $t(384) = 1.982, p < 0.048$, higher level of social support $t(377) = -2.395, p = 0.017$, lower perceived discrimination score $t(382) = 5.118, p < 0.001$, higher attitudes toward women score $t(361) = -5.356, p < 0.001$, lower beliefs toward sexuality score $t(366) = 7.009, p < 0.001$, and lower religiosity score $t(376) = 3.605, p < 0.001$.

Bivariate analysis also included independent samples t-tests (as shown in Table 15) to examine the differences in continuous predictors (age and sociocultural factors) by reported ever having received Meningitis vaccine (yes vs. no). Statistically significant differences were found in acculturation heritage score, acculturation mainstream score, social support, perceived discrimination, attitudes towards women, beliefs toward sexuality, and religiosity. Participants who reported having had Meningitis vaccine had lower levels of acculturation heritage $t(375) = 2.216, p = 0.027$, higher levels of acculturation mainstream $t(372) = -4.202, p < 0.001$, higher level of social support

$t(377) = 2.918, p = 0.004$, lower level of perceived discrimination $t(382) = -4.595, p < 0.001$, higher attitude toward women score $t(358) = 6.679, p < .001$, lower belief toward sexuality score $t(366) = -4.084, p < 0.001$, and lower religiosity score $t(376) = -3.665, p < 0.001$.

Bivariate analyses also included independent samples t-tests (as shown in Table 15) to examine the differences in continuous predictors (age and sociocultural factors) by reported having received Flu vaccine in past 12 months (yes vs. no). Statistically significant differences were found in age, acculturation mainstream score, perceived stress score, social support, attitude toward women score, and religiosity. Participants who reported having had flu vaccine in the past 12 months had a mean age of 22 $t(384) = -3.763, p < 0.001$, lower levels of acculturation mainstream $t(374) = 3.148, p = 0.002$, lower perceived stress score $t(385) = -5.208, p < 0.001$, higher social support score $t(378) = 2.555, p = .011$, lower attitude towards women score $t(362) = -2.545, p = 0.011$, and higher level of religiosity $t(377) = 2.306, p = 0.022$.

Table 15

Bivariate analysis of the associations between vaccines (age appropriate) and demographic and sociocultural factors (continuous predictors), using t-test

Variables	Ever had HPV vaccine		t(p)	Ever had Meningitis Vaccine		t(p)	Had Flu Vaccine past 12 months		t(p)
	No	Yes		No	Yes		No	Yes	
	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	
Age	21.09 (5.20)	20.67 (2.63)	.906 (.365)	21.28 (4.31)	20.71 (4.48)	-1.254 (.211)	22.10 5.56	20.34 (3.57)	-3.763 (< .001)
Acculturation-Heritage Score	16.56 (6.71)	20.07 (6.98)	-4.850 (< .001)	16.85 (7.22)	18.50 (6.83)	2.216 (.027)	17.21 (6.50)	18.20 (7.24)	1.293 (.197)
Acculturation-Mainstream	21.58 (6.95)	4.22 (.35)	4.890 (< .001)	22.03 (6.77)	19.30 (5.63)	-4.202 (< .001)	18.97 (5.77)	21.08 (6.37)	3.148 (.002)

Perceived Stress Scale	8.17 (2.65)	7.60 (2.85)	1.982 (.048)	7.95 (2.55)	7.95 (2.85)	.002 (.998)	8.94 (2.62)	7.46 (2.65)	-5.208 (< .001)
Social Support	17.25 (2.78)	17.93 (2.49)	-2.395 (.017)	17.01 (2.85)	17.84 (2.55)	2.918 (.004)	17.02 (2.99)	17.77 (2.50)	2.555 (.011)
Perceived Discrimination	30.43 (7.07)	26.76 (6.34)	5.118 (< .001)	31.07 (7.34)	27.77 (6.51)	-4.595 (< .001)	28.55 (7.19)	29.30 (6.92)	.989 (.323)
Attitudes Toward Women	43.45 (10.27)	48.88 (7.54)	-5.356 (< .001)	41.51 (10.78)	48.09 (7.92)	6.679 (< .001)	47.30 (8.57)	44.58 (10.1)	-2.545 (.011)
Beliefs Toward Sexuality	23.40 (4.46)	20.14 (4.12)	7.009 (< .001)	23.37 (4.76)	21.39 (4.35)	-4.084 (< .001)	13.09 (2.94)	13.76 (2.58)	-.593 (.553)
Religiosity	13.92 (2.58)	12.89 (2.84)	3.605 (< .001)	14.16 (2.42)	13.13 (2.83)	-3.665 (< .001)	13.09 (2.94)	13.76 (2.58)	2.306 (.022)

Using multivariate analysis, we examined the predictors of receiving the HPV vaccine, including the individual, sociocultural and access to care factors, as shown in Table 16.

In the first predictive model, individual factors explained somewhere between 12.5% and 17.0% of the variability in receiving the HPV vaccine $X^2 (15, N= 322) = 42.928 p = < .001$. In this model, ever having the HPV Vaccine was statistically associated with the mother's education ($p = .039$) and reported daily interactions with Middle Eastern and non-Middle Eastern students ($p < .001$). The odds of having the HPV vaccine test were 76% higher for Middle Eastern college women whose mothers have college education ($aOR: 1.760; 95\% CI: 1.030 - 3.008$), and 80% higher among those who reported daily interactions with an equal mix of Middle Eastern and non-Middle Eastern students ($aOR: 1.083; 95\% CI: 1.315 - 2.472$). Ever having the HPV Vaccine was not significantly associated with the remaining predictors tested in this model.

In the second predictive model, sociocultural factors explained somewhere between 14.9% and 20.2% of the variability of ever having an HPV vaccine $X^2 (8, N=$

329) = 53.011, $p = <.001$. In this model, ever having an HPV was statistically associated with acculturation-mainstream ($p = .017$) and beliefs toward sexuality ($p = .002$). The odds of ever receiving an HPV vaccine were 7% lower with lower levels of acculturation-mainstream ($aOR: .934$; 95% $CI: .884 - .988$), and 12% lower with higher scores of beliefs toward sexuality ($aOR: .881$; 95% $CI: .815 - .953$). Having received HPV vaccine is not significantly associated with the remaining predictors tested in this model.

In the third predictive model, access to healthcare predictors explained somewhere between 5.2% and 7.1% of the variability in ever having an HPV vaccine X^2 (6, $N = 386$) = 20.694, $p = .002$. In this model, ever having an HPV vaccine was statistically associated with having health insurance ($p = .050$) and having a gynecologist or access to a women's health center ($p < .001$). The odds of ever having an HPV vaccine are 3 times higher among those who reported having health insurance ($aOR: 3.023$; 95% $CI: .999 - 9.245$) and 19% higher among those who reported having a gynecologist or access to a women's health center ($aOR: 2.190$; 95% $CI: 1.416 - 3.387$). Receiving HPV vaccine was not significantly associated with the remaining predictors tested in this model.

Table 16

Logistic regression analysis of predictors of receiving an hpv vaccine

<div><div></div><div>Predictors</div></div>	Criterion Variables	Received HPV Vaccine						
		B	SE	Wald	df	Sig.	Exp(B)	95% CI
Individual Predictors (N=322)								
Age (<i>M=21</i>)		-.055	.049	1.265	1	.261	.946	.859-1.042
US born (<i>Yes vs. No</i>)		.453	.328	1.901	1	.168	1.573	.826-2.994
Parents reside in NJ (<i>Yes vs. No</i>)		.369	.315	1.365	1	.243	1.446	.779-2.683
Student attendance status: (<i>Full time vs. Part time</i>)		.111	.481	.053	1	.817	1.117	.435-2.868

Student enrollment status (<i>Under Graduate vs. Graduate</i>)	.413	.420	.969	1	.325	1.511	.664-3.439
Full time work status (<i>Yes vs. No</i>)	.426	.455	.875	1	.349	1.531	.627-3.737
Single status (<i>Yes vs. No</i>)	-.189	.305	.383	1	.536	.828	.456-1.505
Mother attended college: (<i>Yes vs. No</i>)	.565	.273	4.276	1	.039	1.760	1.030-3.008
Father attended college: (<i>Yes vs. No</i>)	.189	.392	.233	1	.629	1.208	.560-2.606
Immigrated to US-education: (<i>Yes vs. No</i>)	-.310	.260	1.422	1	.233	.733	.440-1.221
Immigrated to US-socioeconomic: (<i>Yes vs. No</i>)	.228	.282	.650	1	.420	1.256	.772-2.184
Religion (<i>Christian vs. Muslim</i>)	.101	.285	.125	1	.723	1.106	.633-1.934
Belongs to student organizations (<i>Yes vs. No</i>)	.204	.278	.535	1	.464	1.226	.710-2.116
Belongs to religious organizations (<i>Yes vs. No</i>)	-.210	.269	.611	1	.434	.810	.478-1.373
Daily interactions (<i>mostly ME, Mostly non-ME, an equal mix of both</i>)	.590	.161	13.414	1	<.001	1.803	1.315-2.472
Constant	-2.504	1.384	3.274	1	.070	.082	
Omnibus Tests of Model Coefficients	Chi-square=42.928; df=15; P<.001						
Model Summary	-2 Log likelihood=383.373; Cox & Snell R ² =12.5%; Nagelkerke R ² =17.0%						
Sociocultural Predictors (N=329)							
Acculturation - Heritage	.027	.022	1.447	1	.229	1.027	.983-1.074
Acculturation - Mainstream	-.068	.029	5.669	1	.017	.934	.884-.988
Perceived Stress	.013	.058	.052	1	.819	1.013	.904-1.136
Social Support	.027	.057	.221	1	.638	1.027	.918-1.150
Perceived Discrimination	-.018	.023	.633	1	.426	.982	.938-1.027
Attitude Towards Women	.000	.022	.000	1	.993	1.000	.957-1.045
Beliefs Toward Sexuality	-.127	.040	10.064	1	.002	.881	.815-.953
Religiosity	.068	.057	1.422	1	.233	1.070	.957-1.1
Constant	2.181	2.335	.872	1	.350	8.853	
Omnibus Tests of Model Coefficients	Chi-square=53.011 df=8; P<.001						
Model Summary	-2 Log likelihood=386.747; Cox & Snell R ² =14.9%; Nagelkerke R ² =20.2%						
Access to Healthcare (N=386)							
Health Insurance (<i>Yes vs. No</i>)	1.112	.568	3.863	1	.050	3.0239	.999-9.245
Have a gynecologist or access to Women's Health Center WHC (<i>Yes vs. No</i>)	.784	.223	12.404	1	<.001	2.190	1.416-3.387
Not being able to access a gynecologist or WHC in past year (<i>Yes vs. No</i>)	-.115	.498	.053	1	.817	.891	.336-2.366
Obtain health information from Internet (<i>Yes vs. No</i>)	.114	.247	.213	1	.645	1.120	.691-1.817
Obtain health information from family/friends (<i>Yes vs. No</i>)	-.132	.270	.238	1	.625	.876	.516-1.489
Obtain health information from television (<i>Yes vs. No</i>)	.416	.499	.696	1	.404	1.516	.570-4.027

Constant	-2.023	.617	10.735	1	.001	.132	
Omnibus Tests of Model Coefficients	Chi-square=20.694; df=6; P=.002.						
Model Summary	-2 Log likelihood=486.045; Cox & Snell R ² =5.2%; Nagelkerke R ² =7.1%						

Note. ME=Middle Eastern

Using multivariate analysis, we examined the predictors for receiving the meningitis vaccine, including the individual, sociocultural and access to care factors, as shown in Table 17. In the first predictive model, individual factors explained somewhere between 14.4% and 19.6% of the variability in receiving the meningitis vaccine X^2 (15, N= 322) = 50.130 $p < .001$. In this model, receiving the meningitis vaccine was statistically associated with place of birth ($p = .005$), student attendance status ($p = .038$), mother's education ($p = .018$), and reason for immigrating to the US ($p = .040$). The odds of receiving the meningitis vaccine were over 2 times higher among full-time students (aOR : 2.643: 95% CI : 1.053 - 6.634). In contrast, the odds of receiving the meningitis vaccine were 58% lower among those born in the US (aOR : .417: 95% CI : .266 - .770), 47% lower among those whose mother's attended college (aOR : .417: 95% CI : .266 - .770), 43% lower among those who reported immigrating to the US for socioeconomic reasons (aOR : .566: 95% CI : .328 - .975). Receiving the meningitis vaccine was not significantly associated with the remaining predictors tested in this model.

In the second predictive model, sociocultural factors explained somewhere between 11.9% and 16.2% of the variability of receiving the meningitis vaccine X^2 (8, N= 330) = 41.947, $p < .001$. In this model, receiving the meningitis vaccine was statistically associated with attitudes toward women ($p = .003$). The odds of having receiving the meningitis vaccine were 6% lower among those with higher scores of attitudes toward

women (*aOR*: .939; 95% *CI*: .900 - .979). Having received HPV vaccine is not significantly associated with the remaining predictors tested in this model.

In the third predictive model, access to healthcare predictors explained somewhere between 10.3% and 14.0% of the variability in receiving meningitis vaccine X^2 (6, N= 384) = 41.547, $p = <.001$). In this model, receiving the meningitis vaccine was statistically associated with having a healthcare provider ($p = .003$), having seen the healthcare provider in the past 12 months ($p = .013$), and obtaining health information from the Internet ($p = .004$). The odds of receiving the meningitis vaccine are 55% higher for those who reported having a healthcare provider as a predictor (*aOR*: .445; 95% *CI*: .272 - .761), 49% higher for those who have seen the healthcare provider in the past 12 months (*aOR*: .513; 95% *CI*: .302 - .869), and 51% higher for those who reported obtaining health information from the Internet (*aOR*: .486; 95% *CI*: .299 - .790). Receiving the meningitis vaccine was not significantly associated with the remaining predictors tested in this model.

Table 17

Logistic regression analysis of predictors of receiving a meningitis vaccine

<div>Predictors</div>	<div>Criterion Variables</div>	<div>Received Meningitis Vaccine</div>						
		<div>B</div>	<div>SE</div>	<div>Wald</div>	<div>df</div>	<div>Sig.</div>	<div>Exp(B)</div>	<div>95% CI</div>
<div>Individual Predictors (N=322)</div>								
<div>Age (<i>M</i>=21)</div>		-.012	.039	.094	1	.759	.988	.915-1.06
<div>US born (<i>Yes vs. No</i>)</div>		-.876	.313	7.820	1	.005	.417	.226-.770
<div>Parents reside in NJ (<i>Yes vs. No</i>)</div>		-.050	.308	.027	1	.870	.951	.520-1.740
<div>Student attendance status: (<i>Full time vs. Part time</i>)</div>		.972	.470	4.284	1	.038	2.643	1.053-6.634
<div>Student enrollment status (<i>Under Graduate vs. Graduate</i>)</div>		-.134	.420	.102	1	.749	.874	.384-1.991
<div>Full time work status (<i>Yes vs. No</i>)</div>		-.031	.473	.004	1	.947	.969	.384-2.450
<div>Single status (<i>Yes vs. No</i>)</div>		-.498	.304	2.675	1	.102	.608	.335-1.104

Mother attended college: <i>(Yes vs. No)</i>	-.633	.268	5.561	1	.018	.531	.314-.899
Father attended college: <i>(Yes vs. No)</i>	.147	.393	.140	1	.708	1.158	.536-1.664
Immigrated to US-education: <i>(Yes vs. No)</i>	-.011	.265	.002	1	.967	.989	.588-1.664
Immigrated to US-socioeconomic: <i>(Yes vs. No)</i>	-.570	.278	4.214	1	.040	.566	.328-.975
Religion <i>(Christian vs. Muslim)</i>	.108	.290	.139	1	.710	1.114	.631-1.968
Belongs to student organizations <i>(Yes vs. No)</i>	-.405	.285	2.026	1	.155	.667	.382-1.165
Belongs to religious organizations <i>(Yes vs. No)</i>	-.159	.271	.344	1	.558	.853	.502-1.451
Daily interactions <i>(mostly ME, Mostly non-ME, an equal mix of both)</i>	-.262	.158	2.756	1	.097	.770	.565-1.048
Constant	1.040	1.285	.655	1	.418	2.829	
Omnibus Tests of Model Coefficients	Chi-square=50.130; df=15; P<.001						
Model Summary	-2 Log likelihood=380.020; Cox & Snell R ² =14.4%; Nagelkerke R ² =19.6%						
Sociocultural Predictors (N=330)							
Acculturation - Heritage	.015	.022	.453	1	.501	1.015	.972-1.060
Acculturation - Mainstream	.003	.026	.013	1	.908	1.003	.953-1.056
Perceived Stress	.001	.058	.000	1	.988	1.001	.893-1.122
Social Support	-.065	.056	1.331	1	.249	.937	.839-1.047
Perceived Discrimination	-.002	.024	.005	1	.943	.998	.953-1.046
Attitude Towards Women	-.063	.022	8.575	1	.003	.939	.900-979
Beliefs Toward Sexuality	.023	.039	.336	1	.562	1.023	.947-1.105
Religiosity	.053	.061	.748	1	.387	1.054	.935-1.188
Constant	2.093	2.319	.815	1	.367	8.106	
Omnibus Tests of Model Coefficients	Chi-square=41.947 df=8; P<.001						
Model Summary	-2 Log likelihood=401.417; Cox & Snell R ² =11.9%; Nagelkerke R ² =16.2%						
Access to Healthcare (N=384)							
Health Insurance <i>(Yes vs. No)</i>	-.246	.453	.296	1	.587	.782	.322-1.899
Have Healthcare Provider (HCP) <i>(Yes vs. No)</i>	-.788	.263	9.004	1	.003	.455	.272-.761
Have seen HCP in past 12 months <i>(Yes vs. No)</i>	-.668	.269	6.153	1	.013	.513	.302-.869
Obtain health information from Internet <i>(Yes vs. No)</i>	-.721	.248	8.478	1	.004	.486	.299-.790
Obtain health information from family/friends <i>(Yes vs. No)</i>	.037	.286	.017	1	.898	1.038	.592-1.819
Obtain health information from television <i>(Yes vs. No)</i>	-.019	.564	.001	1	.973	.981	.325-2.960
Constant	1.176	.508	5.358	1	.021	3.241	
Omnibus Tests of Model Coefficients	Chi-square=41.547; df=6; P<.001						
Model Summary	-2 Log likelihood=468.532; Cox & Snell R ² =10.3%; Nagelkerke R ² =14.0%						

Note: ME=Middle Eastern

Using multivariate analysis, we examined the predictors for receiving the flu vaccine in the past 12 months, including the individual, sociocultural and access to care factors, as shown in Table 18. In the first predictive model, individual factors explained somewhere between 14.5% and 20.0% of the variability in receiving the flu vaccine X^2 (15, N= 323) = 50.498, $p = <.001$. In this model, receiving the flu vaccine was statistically associated with age ($p = .024$), student attendance status ($p = .048$), reasons for immigrating to the US ($p < .001$), and religion ($p = .009$). The odds of receiving the flu vaccine were 12.4% higher among younger students (< 21 years) (aOR : 1.124; 95% CI : 1.015 - 1.234), over 2 times higher among full-time students (aOR : 2.489; 95% CI : 1.008 - 6.149), and over 2 times higher among Christian students (aOR : 2.291; 95% CI : 1.228 - 4.275). In contrast, the odds of receiving the flu vaccine were 64% lower among those who reported immigrating to the US for socioeconomic reasons (aOR : .362; 95% CI : .211 - .622). Receiving the flu vaccine was not significantly associated with the remaining predictors tested in this model.

In the second predictive model, sociocultural factors explained somewhere between 10.8% and 14.9% of the variability of having received the flu vaccine X^2 (8, N= 330) = 37.548, $p = <.001$. In this model, receiving the flu vaccine was statistically associated with perceived stress ($p = .001$). The odds of receiving the flu vaccine were 21% higher with higher perceived stress scores (aOR : 1.208; 95% CI : 1.076 - 1.357). Receiving the flu vaccine was not significantly associated with the remaining predictors tested in this model.

In the third predictive model, access to healthcare predictors explained somewhere between 12.9% and 17.9% of the variability in receiving the flu vaccine in the past 12 months $X^2 (6, N= 386) = 53.427, p = <.001$. In this model, receiving the flu vaccine was statistically associated with health insurance ($p = .001$) and seeing their HCP in the past 12 months ($p = < .001$). The odds of receiving the flu vaccine in the past 12 months were 81% higher in Middle Eastern college women who reported having health insurance ($aOR: .191$; 95% $CI: .071 - .516$), and 77% higher among those who reported seeing their HCP in the past 12 months ($aOR: .233$; 95% $CI: .133 - .409$). Receiving the flu vaccine in the past 12 months was not significantly associated with the remaining predictors tested in this model.

Table 18

Logistic regression analysis of predictors of receiving a flu vaccine in the past year

Predictors	Criterion Variables	Received Flu Vaccine in past 12 months						
		B	SE	Wald	df	Sig.	Exp(B)	95% CI
Individual Predictors (N=323)								
Age (<i>M=21</i>)		.117	.052	5.088	1	.024	1.124	1.015-1.234
US born (<i>Yes vs. No</i>)		.093	.322	.084	1	.772	1.098	.584-2.063
Parents reside in NJ (<i>Yes vs. No</i>)		.004	.321	.000	1	.991	1.004	.535-1.884
Student attendance status: (<i>Full time vs. Part time</i>)		.912	.461	3.908	1	.048	2.489	1.008-6.149
Student enrollment status (<i>Under Graduate vs. Graduate</i>)		-.337	.429	.773	1	.379	.686	.296-1.589
Full time work status (<i>Yes vs. No</i>)		.052	.467	.012	1	.912	1.053	.421-2.632
Single status (<i>Yes vs. No</i>)		-.160	.320	.251	1	.616	.852	.455-1.594
Mother attended college: (<i>Yes vs. No</i>)		.127	.279	.205	1	.650	1.135	.656-1.962
Father attended college: (<i>Yes vs. No</i>)		-.333	.374	.795	1	.373	.717	.345-1.491
Immigrated to US-education: (<i>Yes vs. No</i>)		-.281	.274	1.051	1	.305	.755	.441-1.292
Immigrated to US-socioeconomic: (<i>Yes vs. No</i>)		-1.015	.276	13.528	1	<.001	.362	.211-.622
Religion (<i>Christian vs. Muslim</i>)		.829	.318	6.794	1	.009	2.291	1.228-4.275

Belongs to student organizations <i>(Yes vs. No)</i>	.470	.289	2.643	1	.104	1.600	.908-2.818
Belongs to religious organizations <i>(Yes vs. No)</i>	.259	.270	.920	1	.337	1.296	.763-2.201
Daily interactions <i>(mostly ME, Mostly non-ME, an equal mix of both)</i>	-.114	.162	.491	1	.484	.892	.649-1.227
Constant	-4.128	1.406	8.616	1	.003	.016	
Omnibus Tests of Model Coefficients	Chi-square=50.498; df=15; P<.001						
Model Summary	-2 Log likelihood=365.157; Cox & Snell R ² =14.5%; Nagelkerke R ² =20.0%						
Sociocultural Predictors (N=330)							
Acculturation - Heritage	-.021	.023	.249	1	.618	.988	.944-1.035
Acculturation - Mainstream	-.038	.027	1.916	1	.166	.963	.913-1.016
Perceived Stress	.189	.059	10.274	1	.001	1.208	1.076-1.357
Social Support	-.018	.056	.104	1	.748	.982	.879-1.097
Perceived Discrimination	-.026	.024	1.195	1	.274	.974	.930-1.021
Attitude Towards Women	.012	.022	.277	1	.598	1.012	.969-1.056
Beliefs Toward Sexuality	.048	.039	1.479	1	.224	1.049	.971-1.132
Religiosity	-.054	.059	.841	1	.359	.947	.844-1.064
Constant	-1.036	2.299	.203	1	.652	.355	
Omnibus Tests of Model Coefficients	Chi-square=37.548 df=8; P<.001						
Model Summary	-2 Log likelihood=386.588; Cox & Snell R ² =10.8%; Nagelkerke R ² =14.9%						
Access to Healthcare (N=386)							
Health Insurance <i>(Yes vs. No)</i>	-1.656	.508	10.632	1	.001	.191	.071-.516
Have Healthcare Provider (HCP) <i>(Yes vs. No)</i>	.459	.300	2.344	1	.126	1.583	.879-2.849
Have seen HCP in past 12 months <i>(Yes vs. No)</i>	-1.456	.287	25.732	1	<.001	.233	.133-.409
Obtain health information from Internet <i>(Yes vs. No)</i>	.469	.268	3.054	1	.081	1.598	.945-2.703
Obtain health information from family/friends <i>(Yes vs. No)</i>	-.232	.286	.659	1	.417	.793	.453-1.388
Obtain health information from television <i>(Yes vs. No)</i>	.639	.523	1.490	1	.222	1.894	.679-5.283
Constant	1.423	.559	6.468	1	.011	4.148	
Omnibus Tests of Model Coefficients	Chi-square=53.427; df=6; P<.001						
Model Summary	-2 Log likelihood=441.134; Cox & Snell R ² =12.9%; Nagelkerke R ² =17.9%						

Note. ME=Middle Eastern

Sexual Behaviors

Regarding sexual behaviors, 61% percent of the women reported that they have ever had sexual intercourse. Among those who were sexually active, 57% reported using a condom and 22% reported not using any form of contraception during the last time they

had sexual intercourse. Participant reported having had multiple sexual partners in the past three months and in lifetime. Multiple sexual partners are defined as three or more. Chi-square tests were used to examine the bivariate associations between sexual behaviors and the categorical predictors, as shown in Table 19.

Ever had sexual intercourse was significantly associated with parent's residence, student attendance status, full-time work, reason for immigration to the US, religion, belonging to student and religious organizations, reported daily interactions, having health insurance having seen a healthcare provider, and having access to a gynecologist or women's health center.

Ever having sexual intercourse was higher among students whose parent's live in New Jersey $X^2 (1, N=400)= 3.838, p= .050$, part-time students $X^2 (1, N=389)= 11.485, p= .001$, those who worked full-time $X^2 (1, N=400)= 10.478, p= .001$, married $X^2 (1, N=399)= 61.022, p < .001$, those who immigrated to the US for socio-economic reasons $X^2 (1, N=402)= 5.842, p= .019$, Christian $X^2 (1, N=387)= 14.520, p < .001$, those who report not belonging to student organizations $X^2 (1, N=402)= 27.322, p < .001$ nor belonging to religious organizations $X^2 (1, N=402)= 18.854, p < .001$, those report daily interactions with an equal mix of Middle Eastern and non-Middle Eastern students $X^2 (2, N=393)= 11.808, p= .003$, having health insurance $X^2 (1, N=395)= 13.136, p < .001$, having seen a healthcare provider in the past twelve months $X^2 (1, N=385)= 4.344, p= .037$, and having a gynecologist or access to a women's health center $X^2 (1, N=385)= 21.041, p < .001$.

Condom use was significantly associated with having immigrated to the US for education or religion, reported daily interactions, and having seen a healthcare provider in

the past twelve months. Condom use is higher among students who did not immigrate to the US for education $\chi^2 (1, N=242)= 5.500, p = .019$, Christian $\chi^2 (1, N=232)= 7.081, p = .005$, those who report daily interactions with an equal mix of both Middle Eastern and non-Middle Eastern students $\chi^2 (2, N=235)= 7.011, p = .030$, and those who have seen a healthcare provider within the past twelve months $\chi^2 (1, N=233)= 5.612, p = .018$.

Use of contraception was significantly associated with single status, religion, reported daily interactions, having a healthcare provider, and having a gynecologist or access to a women's health center. Use of contraception is higher among students who are married $\chi^2 (1, N=242)= 7.614, p = .006$, Christian $\chi^2 (1, N=233)= 6.548, p = .011$, and those who report daily interactions with an equal mix of both Middle Eastern and non-Middle Eastern students $\chi^2 (2, N=236)= 14.268, p = .001$, having a healthcare provider $\chi^2 (1, N=234)= 21.662, p < .001$, , and having a gynecologist or access to a women's healthcare center $\chi^2 (1, N=234)= 24.672, p < .001$.

Table 19

Bivariate analysis of the associations between Sexual Behaviors and the categorical study predictors, using Chi-Square

Variable	Categories	Ever had sexual intercourse		Condom Use		Use Contraception	
		%	$\chi^2 (P)$	%	$\chi^2 (P)$	%	$\chi^2 (P)$
US born	No	61.6%	.582	58.7%	1.354	80.2%	2.819
	Yes	56.8%	(.446)	48.8%	(.245)	68.3%	(.093)
Parents live in NJ	No	68.5%	3.838	55.4%	.150	76.0%	.178
	Yes	57.8%	(.050)	58.1%	(.698)	78.4%	(.673)
Student attendance status	Full time	57.8%	11.485	57.0%	.020	75.6%	1.452
	Part time	81.8%	(.001)	55.8%	(.888)	84.1%	(.228)
Student status	Undergrad	57.55	1.522	56.3%	.022	75.6%	2.110
	Graduate	65.3%	(.217)	57.4%	(.883)	85.4%	(.146)
Full-time work	No	57.0%	10.478	58.9%	.398	77.5%	4.77
	Yes	78.5%	(.001)	54.0%	(.528)	82.0%	(.490)
Single	No	90.0%	61.022	58.9%	.206	86.0%	7.614
	Yes	48.4%	(<.001)	56.0%	(.650)	71.1%	(.006)
Mother_college	No	63.9%	1.113	53.3%	1.326	75.2%	83.2
	Yes	58.6%	(.292)	60.7%	(.249)	80.1%	(.362)

Father_college	No	54.2%	1.354	56.3%	.015	71.9%	.718
	Yes	62.2%	(.245)	57.4%	(.901)	78.6%	(.397)
Immigrated to US education	No	62.4%	.382	65.7%	5.500	81.5%	1.543
	Yes	59.4%	(.537)	50.7%	(.019)	74.8%	(.214)
Immigrated to US socioeconomic	No	53.1%	5.482	49.4%	3.021	71.4%	2.629
	Yes	65.0%	(.019)	61.2%	(.082)	80.7%	(.105)
Religion	Christian	74.0%	14.520	69.1%	7.801	86.2%	6.548
	Muslim	53.8%	(< .001)	50.7%	(.005)	71.9%	(.011)
Belongs to Student Organizations	No	70.3%	27.322	53.9%	3.383	78.2%	.074
	Yes	43.8%	(< .001)	67.2%	(.066)	76.6%	(.785)
Belongs to Relig. Organizations	No	68.3%	18.854	59.4%	1.157	78.9%	.496
	Yes	46.9%	(< .001)	51.6%	(.282)	74.6%	(.481)
Daily interactions	Mostly ME	46.8%	11.808	47.1%	7.011	58.8%	14.268
	Mostly non-M.E.	63.4%	(.003)	49.2%	(.030)	78.1%	(.001)
	Equal mix of both	66.7%		57.0%		85.1%	
Health Insurance	No	26.9%	13.136	28.6%	2.449	71.4%	.191
	Yes	62.9%	(< .001)	58.3%	(.118)	78.4%	(.662)
Have Health Care Provider (HCP)	No	58.4%	.531	48.5%	3.382	57.6%	21.662
	Yes	62.4%	(.466)	61.6%	(.066)	85.5%	(< .001)
Have seen HCP past 12 months	No	52.8%	4.344	43.6%	5.612	69.6%	2.976
	Yes	64.4%	(.037)	61.6%	(.018)	80.5%	(.085)
Have Gynecologist /Access to WHC	No	49.5%	21.041	50.0%	3.434	61.3%	24.672
	Yes	72.0%	(< .001)	62.2%	(.064)	88.5%	(< .001)
Ever unable to visit Gyn /WHC past 12 months	No	60.2%	2.134	59.0%	2.826	78%	.079
	Yes	76.2%	(.144)	37.5%	(.093)	75%	(.778)
Health info internet	No	58.9%	.368	55.4%	.244	72.0%	2.867
	Yes	61.9%	(.544)	58.7%	(.622)	81.5%	(.090)
Health info family/friends	No	59.4%	.096	47.6%	3.359	69.8%	3.099
	Yes	61.1%	(.756)	60.9%	(.067)	80.6%	(.078)
Health info television	No	60.3%	.499	57.6%	.073	77.8%	1.678
	Yes	68.4%	(.480)	53.8%	(.788)	92.3%	(.195)

Note. ME=Middle Eastern

Bivariate analysis also included independent samples t-tests, as shown in Table 20 to examine the differences in continuous predictors (age and sociocultural factors) by reported ever having sexual intercourse (yes vs. no). Statistically significant differences were found in age, acculturation heritage score, perceived stress scale, social support, belief towards sexuality, and religiosity. Participants who reported ever having had sexual intercourse had a mean age of 21 ($t(384) = -2.628, p = .009$, lower levels of acculturation heritage $t(376) = -5.413, p < 0.001$, lower perceived stress score $t(384) = 5.567, p < 0.001$, higher social support score $t(378) = -2.391, p = 0.017$, lower belief

toward sexuality score $t(368) = 9.280, p < 0.001$, and lower level of religiosity $t(378) = 3.286, p = 0.001$.

Bivariate analysis also included independent samples t-tests (as shown in Table XX) to examine the differences in continuous predictors (age and sociocultural factors) by reported condom use (yes vs. no). Statistically significant differences were found in acculturation heritage score, perceived stress score, social support, perceived discrimination score, attitudes toward women score, and beliefs toward sexuality.

Participants who reported condom use had lower levels of acculturation heritage $t(229) = -3.345, p = 0.001$, lower perceived stress score $t(234) = 3.601, p < 0.001$, higher level of social support $t(231) = -3.306, p = 0.001$, lower perceived discrimination score $t(234) = 2.908, p = .004$, higher attitude toward women score $t(223) = -2.373, p = 0.018$, and lower beliefs toward sexuality score $t(225) = 3.493, p = 0.001$.

Bivariate analysis also included independent samples t-tests as shown in Table 20 to examine the differences in continuous predictors (age and sociocultural factors) by reported contraceptive use (yes vs. no). Statistically significant differences were found in acculturation heritage score, acculturation mainstream, social support, perceived discrimination, attitudes toward women score, beliefs toward sexuality, and religiosity. Participants who reported condom use had lower levels of acculturation heritage $t(230) = -3.763, p < 0.001$, higher levels of acculturation mainstream $t(227) = 3.951, p < 0.001$, higher level of social support $t(232) = -2.623, p = .009$, lower perceived discrimination score $t(235) = 3.493, p = .001$, higher attitudes towards women score $t(224) = -5.169, p < 0.001$, lower beliefs toward sexuality score $t(226) = 5.949, p < 0.001$, and lower level of religiosity $t(231) = 3.529, p = 0.001$.

Table 20

Bivariate analysis of the associations between sexual behaviors and demographic and sociocultural factors (continuous predictors), using t-test

Variables	Ever had Sexual Intercourse		t(p)	Condom Use		t(p)	Use Contraception		t(p)
	No	Yes		No	Yes		No	Yes	
	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	
Age	20.15 (3.49)	21.53 (4.67)	2.628 (.009)	22.0 (6.18)	20.82 (3.14)	1.910 (.057)	21.41 (7.29)	21.28 (3.62)	.174 (.862)
Acculturation-Heritage Score	15.46 (6.27)	19.33 (7.07)	-5.413 (< .001)	17.63 (7.19)	20.70 (6.72)	-3.345 (.001)	16.17 (6.33)	20.26 (7.04)	-3.763 (< .001)
Acculturation-Mainstream	20.61 (6.80)	20.16 (5.91)	.671 (.503)	20.31 (6.51)	19.91 (5.35)	.514 (.608)	22.85 (6.47)	19.31 (5.47)	3.951 (< .001)
Perceived Stress Scale	8.89 (2.48)	7.36 (2.72)	5.567 (< .001)	8.08 (2.73)	6.82 (2.59)	3.601 (< .001)	8.11 (2.78)	7.16 (2.67)	2.274 (.024)
Social Support	17.11 (2.84)	17.79 (2.57)	-2.391 (.017)	17.15 (2.77)	18.26 (2.30)	(-3.306) (.001)	16.96 (2.81)	18.01 (2.46)	-2.623 (.009)
Perceived Discrimination	29.85 (7.24)	28.60 (6.82)	1.711 (.088)	30.01 (7.07)	27.4 (6.42)	2.908 (.004)	31.42 (6.96)	27.77 (6.58)	3.493 (.001)
Attitudes Toward Women	44.83 10.23	45.92 (9.32)	-1.408 (.295)	44.36 (10.30)	47.29 (8.22)	-2.373 (.018)	40.24 (10.19)	47.58 (8.37)	-5.169 (< .001)
Beliefs Toward Sexuality	24.72 (3.82)	20.59 (4.34)	9.280 (< .001)	21.65 (4.80)	19.68 (3.67)	3.493 (.001)	23.48 (4.32)	19.70 3.93	5.949 (< .001)
Religiosity	14.12 (2.52)	13.18 (2.79)	3.286 (.001)	13.46 (2.71)	12.94 (2.83)	1.403 (.162)	14.35 (2.11)	12.83 (2.87)	3.529 (.001)

Using multivariate analysis, we examined the predictors ever having sexual intercourse, including the individual, sociocultural and access to care factors, as shown in Table 21. In the first predictive model, individual factors explained somewhere between 28.9% and 39.1% of the variability in ever having sexual intercourse $X^2 (15, N= 324) = 110.521, p = <.001$. In this model, ever having had sexual intercourse was statistically associated with parent's residence ($p = .021$), marital status ($p < .001$), religion ($p =$

015), belonging to student organizations ($p = .001$), and daily interactions with Middle Eastern/non-Middle Eastern students ($p = .047$). The odds of ever having sexual intercourse were 41% higher among students who had daily interactions with Middle Eastern/non-Middle Eastern students ($aOR: 1.409$; 95% $CI: 1.005 - 1.975$). In contrast, the odds of ever having sexual intercourse were 56% lower among students who reported that their parents reside in New Jersey ($aOR: .437$; 95% $CI: .217 - .881$), 86% lower among single students ($aOR: .142$; 95% $CI: .065 - .310$), 55% lower among Muslim students ($aOR: .455$; 95% $CI: .241 - .856$), and 65% lower among those who report belonging to student organizations ($aOR: .350$; 95% $CI: .193 - .632$). Having had sexual intercourse was not significantly associated with the remaining predictors tested in this model.

In the second predictive model, sociocultural factors explained somewhere between 26.8% and 36.4% of the variability of ever having sexual intercourse $X^2 (8, N=331) = 103.111, p = <.001$. In this model, ever having had sexual intercourse was statistically associated with attitudes towards women ($p = .002$) and beliefs toward sexuality ($p < .001$). The odds of ever having sexual intercourse were 7% lower with higher scores on the attitude towards women scale ($aOR: .927$; 95% $CI: .883 - .973$), and 27% lower with higher beliefs toward sexuality scores ($aOR: .730$; 95% $CI: .663 - .803$). Having had sexual intercourse was not significantly associated with the remaining predictors tested in this model.

In the third predictive model, access to healthcare predictors explained somewhere between 4.1% and 5.6% of the variability of ever having sexual intercourse

Sociocultural Predictors (N=331)							
Acculturation - Heritage	.028	.026	1.183	1	.277	1.029	.977-1.083
Acculturation - Mainstream	-.019	.028	.441	1	.507	.982	.929-1.037
Perceived Stress	.096	.063	2.285	1	.131	.909	.803-1.029
Social Support	.043	.062	.485	1	.486	1.044	.924-1.180
Perceived Discrimination	.032	.027	1.467	1	.226	1.033	.980-1.089
Attitude Towards Women	-.076	.025	9.461	1	.002	.927	.883-.973
Beliefs Toward Sexuality	-.315	.049	41.391	1	<.001	.730	.663-.803
Religiosity	.024	.068	.127	1	.721	1.024	.897-1.170
Constant	9.736	2.703	12.973	1	<.001	16911.759	
Omnibus Tests of Model Coefficients	Chi-square=103.111 df=8; P<.001						
Model Summary	-2 Log likelihood=336.715; Cox & Snell R ² =26.8%; Nagelkerke R ² =36.4%						
Access to Healthcare (N=385)							
Health Insurance (Yes vs. No)	1.366	.472	8.392	1	.004	3.921	1.556-9.884
Have Healthcare Provider (HCP) (Yes vs. No)	-.129	.266	.234	1	.628	.879	.523-1.480
Have seen HCP in past 12 months (Yes vs. No)	.497	.264	3.537	1	.060	1.644	.979-2.759
Obtain health information from Internet (Yes vs. No)	.075	.241	.098	1	.755	1.078	.672-1.729
Obtain health information from family/friends (Yes vs. No)	-.023	.272	.007	1	.934	.978	.574-1.666
Obtain health information from television (Yes vs. No)	.241	.532	.206	1	.650	1.273	.448-3.614
Constant	-1.141	.521	4.797	1	.029	.320	
Omnibus Tests of Model Coefficients	Chi-square=16.089; df=6; P=.013						
Model Summary	-2 Log likelihood=489.713; Cox & Snell R ² =4.1%; Nagelkerke R ² =5.6%						

Note. ME=Middle Eastern

Using multivariate analysis, we examined the predictors for condom use, including the individual, sociocultural and access to care factors, as shown in Table 22. In the first predictive model, individual factors explained somewhere between 13.9% and 18.7% of the variability in condom use $X^2(15, N=193) = 28.844, p = .017$. Condom use was statistically associated with age ($p = .033$) and reason for immigration to the US ($p = .017$). The odds of condom use were 13.4% lower among older students (> 21 years) ($aOR: .866; 95\% CI: .793 - .990$), and 56% lower among those who reported immigrating

to the US education reasons (*aOR*: .441; 95% *CI*: .225 - .866). Condom use was not significantly associated with the remaining predictors tested in this model.

In the second model, sociocultural factors explained somewhere between 9.7% and 13.0 % of the variability in condom use X^2 (8, N= 203) = 20.726, $p = .008$. Condom use was not significantly associated with any of the sociocultural predictors.

In the third predictive model, access to healthcare predictors explained somewhere between 4.9% and 6.6% of the variability in condom use X^2 (6, N= 233) = 11.781, $p = .067$. In this model, condom use was statistically associated with seeing the healthcare provider within the past 12 months ($p = .049$). The odds of condom use were 2 times higher among those who reported seeing the healthcare provider the past 12 months (*aOR*: 2.037; 95% *CI*: 1.004 - 4.130). Condom use is not significantly associated with the remaining predictors tested in this model.

Table 22

Logistic regression analysis of predictors of condom use

Predictors	Criterion Variables	Condom Use						
		B	SE	Wald	df	Sig.	Exp(B)	95% CI
Individual Predictors (N=193)								
Age (<i>M</i> =21)		-.121	.056	4.561	1	.033	.866	.793-.990
US born (<i>Yes vs. No</i>)		.040	.425	.009	1	.925	1.041	.453-2.393
Parents reside in NJ (<i>Yes vs. No</i>)		-.083	.389	.046	1	.830	.920	.429-1.974
Student attendance status: (<i>Full time vs. Part time</i>)		.525	.605	.753	1	.386	1.690	.516-5.534
Student enrollment status (<i>Under Graduate vs. Graduate</i>)		.353	.624	.320	1	.571	1.424	.419-4.835
Full time work status (<i>Yes vs. No</i>)		-.257	.667	.149	1	.700	.773	.209-2.858
Single status (<i>Yes vs. No</i>)		-.325	.373	.763	1	.382	.722	.348-1.499
Mother attended college: (<i>Yes vs. No</i>)		.296	.341	.753	1	.385	1.344	.689-2.621
Father attended college: (<i>Yes vs. No</i>)		-.742	.523	2.014	1	.156	.476	.171-1.327

Immigrated to US-education: <i>(Yes vs. No)</i>	-.818	.344	5.649	1	.017	.441	.225-.866
Immigrated to US-socioeconomic: <i>(Yes vs. No)</i>	.118	.370	.102	1	.750	1.125	.545-2.324
Religion <i>(Christian vs. Muslim)</i>	-.562	.347	2.627	1	.105	.570	.289-1.125
Belongs to student organizations <i>(Yes vs. No)</i>	.570	.395	2.088	1	.148	1.769	.816-3.835
Belongs to religious organizations <i>(Yes vs. No)</i>	-.065	.365	.032	1	.859	.937	.459-1.916
Daily interactions <i>(mostly ME, Mostly non-ME, an equal mix of both)</i>	.388	.208	3.460	1	.063	1.473	.979-2.217
Constant	2.866	1.775	2.644	1	.104	17.915	
Omnibus Tests of Model Coefficients	Chi-square=28.844; df=15; P=.017						
Model Summary	-2 Log likelihood=234.337; Cox & Snell R ² =13.9%;NagelkerkeR ² =18.7%						
Sociocultural Predictors (N=203)							
Acculturation - Heritage	.030	.027	1.216	1	.270	1.030	.977-1.087
Acculturation - Mainstream	.017	.034	.260	1	.610	1.017	.952-1.087
Perceived Stress	-.091	.069	1.733	1	.188	.913	.797-1.045
Social Support	.079	.073	1.153	1	.283	1.082	.937-1.249
Perceived Discrimination	-.016	.030	.270	1	.603	.984	.927-1.045
Attitude Towards Women	.020	.029	.469	1	.493	1.020	.964-1.079
Beliefs Toward Sexuality	-.018	.052	.114	1	.735	.982	.887-1.088
Religiosity	-.008	.070	.014	1	.905	.992	.865-1.137
Constant	-1.417	2.888	.241	1	.624	.242	
Omnibus Tests of Model Coefficients	Chi-square=20.726 df=8; P<=.008						
Model Summary	-2 Log likelihood=258.080; Cox & Snell R ² =9.7%; Nagelkerke R ² =13.0%						
Access to Healthcare (N=233)							
Health Insurance <i>(Yes vs. No)</i>	1.137	.876	1.685	1	.194	3.119	.560-17.373
Have Healthcare Provider (HCP) <i>(Yes vs. No)</i>	.069	.341	.041	1	.840	1.071	.549-2.089
Have seen HCP in past 12 months <i>(Yes vs. No)</i>	.711	.361	3.889	1	.049	2.037	1.004-4.130
Obtain health information from Internet <i>(Yes vs. No)</i>	.355	.313	1.283	1	.257	1.426	.772-2.634
Obtain health information from family/friends <i>(Yes vs. No)</i>	.666	.347	3.677	1	.055	1.946	.985-3.845
Obtain health information from television <i>(Yes vs. No)</i>	-.233	.626	.139	1	.709	.792	.232-2.701
Constant	-2.092	.975	4.608	1	.032	.123	
Omnibus Tests of Model Coefficients	Chi-square=11.781 df=6; P=.067						
Model Summary	-2 Log likelihood=305.325; Cox & Snell R ² =4.9%; Nagelkerke R ² =6.6%						

Note. ME=Middle Eastern

Using multivariate analysis, we examined the predictors of contraception use, including the individual, sociocultural, and access to care factors, as shown in Table 23.

In the first predictive model, individual factors explained somewhere between 14.6% and 22.4% of the variability in contraception use $X^2 (15, N= 194) = 30.708, p = .010$. In this model, contraception use was statistically associated with marital status ($p = .016$), religion ($p = .038$), and interactions with Middle Eastern and non-Middle Eastern students ($p = .009$). The odds of contraception use were 89% higher among students who report daily interactions with an equal mix of Middle Eastern and non-Middle Eastern students ($aOR: 1.8883; 95\% CI: 1.169 - 3.034$). In contrast, the odds of contraception use were 69% lower among single students ($aOR: .313; 95\% CI: .122 - .803$), and 61% lower among Muslim students ($aOR: .390; 95\% CI: .161 - .948$). Contraception was not significantly associated with the remaining predictors tested in this model.

In the second model, sociocultural factors explained somewhere between 18% and 27.1% of the variability in contraception use $X^2 (8, N= 204) = 40.501, p = <.001$. Contraception use was not significantly associated with any of the sociocultural predictors.

In the third predictive model, access to care predictors explained somewhere between 11.3% and 17.5% of the variability in contraception use $X^2 (6, N= 234) = 28.185, p = <.001$. In this model, contraception use was statistically associated with having a gynecologist or access to a women's health center ($p < .001$). The odds of contraception use were 66% higher among Middle Eastern college who report having a gynecologist or access to a women's health center ($aOR: 4.657; 95\% CI: 2.359 - 9.190$). Contraception use was not significantly associated with the remaining predictors tested in this model.

Health Insurance (<i>Yes vs. No</i>)	.171	.952	.032	1	.858	1.186	.184-7.663
Have gynecologist or access to Women's Health Center WHC (<i>Yes vs. No</i>)	1.538	.347	19.667	1	<.001	4.657	2.359-9.190
Was there a time in past 12 months when you could not access gynecologist or WHC (<i>Yes vs. No</i>)	-.140	.668	.044	1	.834	.869	.235-3.220
Obtain health information from Internet (<i>Yes vs. No</i>)	.467	.389	1.442	1	.230	1.595	.744-3.417
Obtain health information from family/friends (<i>Yes vs. No</i>)	.631	.420	2.253	1	.133	1.879	.825-4.282
Obtain health information from television (<i>Yes vs. No</i>)	1.077	1.101	.957	1	.328	2.935	.339-25.381
Constant	-.419	1.039	.162	1	.687	.658	
Omnibus Tests of Model Coefficients	Chi-square=28.185; df=6; P<.001						
Model Summary	-2 Log likelihood=217.187; Cox & Snell R ² =11.3%; Nagelkerke R ² =17.5%						

Note. ME=Middle Eastern

Body Weight, Nutrition, and Physical Activity

In this study, 41% of the women reported trying to maintain weight and 43% reported trying to lose weight. Further, 37% reported partaking in physical activity/exercise in order to lose weight (20%), to avoid gaining weight (15%), or for recreation (18%). Chi-square tests were used to examine the bivariate associations between body weight, nutrition, and physical activity and the categorical predictors, as shown in Tables 24 and 25.

High intake of sugary drinks is defined as consuming three or more per week. High intake of sugary drinks is significantly associated with parent's place of residence, father's education, reason for immigration to the US, belonging to student organizations, reported daily interactions, having a healthcare provider, having a gynecologist or have access to a women's health center, and obtaining health information from the internet and television.

High intake of sugary drinks is higher among students whose parents lived in New Jersey X^2 (1, N=396)= 4.870, p = .027, those whose fathers attended college X^2 (1,

$N=394$)= 29.399, $p < .001$, those who did not immigrate to the US for socio-economic reasons $X^2 (1, N=398)= 4.177, p=.041$, those who belonged to student organizations $X^2 (1, N=398)= 21.601, p < .001$, those who report daily interactions with mostly non-Middle Eastern students $X^2 (2, N=389)= 8.954, p = .011$, those who has a healthcare provider $X^2 (1, N= 384)= 17.797, p < .001$, those who have a gynecologist or access to a women's health center $X^2 (1, N=384)= 5.866, p = .015$ and those who obtained health information from the internet $X^2 (1, N=398)= 16.586, p < .001$, and those who obtained health information from television $X^2 (1, N=398)= 9.069, p= .003$.

Trying to lose weight was not significantly associated with the categorical predictors in this study. Trying to maintain weight was significantly associated with reason for immigration to the US, belonging to student organizations, and having a healthcare provider.

Trying to maintain weight was higher in students who did not immigrate to the US for socio-economic reasons $X^2 (1, N=398)= 4.864, p= .027$, and those who reported belonging to student organizations $X^2 (1, N=398)= 4.477, p= .034$, and those who had a health care provider $X^2 (1, N=384)= 9.514, p = .002$.

Table 24

Bivariate analysis of the associations between nutrition and the categorical study predictors, using chi-square

Variable	Categories	High Intake of Sugary Drinks		Trying to lose weight		Trying to maintain weight	
		%	X ² (P)	%	X ² (P)	%	X ² (P)
US born	No	51.9%	.508	44.6%	1.822	41.0%	.023
	Yes	47.3%	(.476)	36.0%	(.177)	40.0%	(.880)
Parents live in NJ	No	41.8%	4.870	39.1%	.579	62.7%	.768
	Yes	54.2%	(.027)	43.3%	(.447)	57.9%	(.810)
Student attendance status	Full time	49.1%	.997	43.6%	2.020	40.6%	.179
	Part time	56.4%	(.318)	33.3%	.155	43.6%	(.672)
Student status	Undergrad	49.7%	2.568	43.0%	.153	39.6%	1.240
	Graduate	60.0%	(.109)	40.5%	(.696)	46.7%	(.266)
Full-time work	No	49.4%	.978	43.9%	1.626	40.8%	.013
	Yes	56.1%	(.323)	35.4%	(.202)	41.5%	(.910)
Single	No	53.3%	.413	41.3%	.124	39.2%	.243
	Yes	49.8%	(.520)	43.2%	(.725)	41.8%	(.622)
Mother_college	No	48.2%	.488	41.4%	.175	40.0%	.110
	Yes	51.7%	(.485)	43.5%	(.676)	41.7%	(.740)
Father_college	No	83.1%	29.399	51.7%	2.112	41.7%	.009
	Yes	44.8%	(< .001)	41.5%	(.146)	41.0%	(.925)
Immigrated to US education	No	55.3%	2.726	42.9%	.017	38.6%	.551
	Yes	46.9%	(.099)	42.3%	(.897)	42.3%	(.458)
Immigrated to US socioeconomic	No	57.3%	4.177	38.7%	1.331	47.9%	4.864
	Yes	46.7%	(.041)	44.7%	(.249)	36.6%	(.027)
Religion	Christian	55.1%	1.695	43.3%	.032	34.4%	2.291
	Muslim	48.1%	(.193)	42.4%	(.859)	42.5%	(.130)
Belongs to Student Organizations	No	41.7%	21.601	41.1%	.601	36.8%	4.477
	Yes	66.0%	(< .001)	45.1%	(.435)	47.6%	(.034)
Belongs to Relig. Organizations	No	50.0%	.077	43.1%	.099	37.45	3.457
	Yes	51.5%	(.781)	41.5%	(.753)	47.1%	(.064)
Daily interactions	Mostly ME	39.4%	8.954	45.0%	.757	38.5%	2.529
	Mostly non-M.E.	60.2%	(.011)	43.4%	(.685)	48.0%	(.282)
	Equal mix of both	50.5%		40.0%		39.0%	
Health Insurance	No	60.0%	1.096	34.6%	.720	44%	.143
	Yes	49.2%	(.295)	43.1%	(.396)	40.2%	(.705)
Have Health Care Provider (HCP)	No	33.0%	17.797	61.1%	.633	28.6%	9.514
	Yes	56.6%	(< .001)	56.7%	(.426)	45.5%	(.002)
Have seen HCP past 12 months	No	49.5%	.013	41.3%	.046	37.5%	.661
	Yes	50.2%	(.909)	42.6%	(.830)	42.1%	(.416)
Have Gyn/Access to WHC	No	43.5%	5.866	38.5%	2.042	39.0%	.491
	Yes	55.8%	(.015)	45.6%	(.153)	42.5%	(.484)
Ever unable to visit Gyn/WHC past 12 months	No	50.9%	1.312	43.0%	.756	40.2%	1.228
	Yes	38.1%	(.252)	33.3%	(.385)	52.4%	(.268)
Health info internet	No	37.7%	16.586	38.3%	1.865	39.6%	.124
	Yes	58.6%	(< .001)	45.3%	(.172)	41.4%	(.724)
Health info family/friends	No	58.8%	3.799	47.1%	1.191	37.9%	.464
	Yes	47.6%	(.051)	41.0%	(.275)	41.7%	(.496)
Health info television	No	48.8%	9.069	42.5%	.027	39.6%	4.168
	Yes	84.2%	(.003)	44.4%	(.869)	63.2%	(.041)

Note. ME=Middle Eastern

Partaking in physical activity/exercise was significantly associated with student status, father's education, belonging to student organizations, reported daily interactions, having a healthcare provider, having a gynecologist or access to women's health center, and obtaining health information from the Internet and the television. Chi-square tests were used to examine the bivariate associations between partaking in physical activity, to lose weight, to avoid gaining weight, and the categorical predictors, as shown in Table 25.

Partaking in physical activity/exercise is higher among graduate students $X^2 (1, N=378)= 4.343, p= .037$, those whose fathers did not attend college $X^2 (1, N=395)= 6.485, p= .011$, those who belonged to student organizations $X^2 (1, N=399)= 6.504, p= .011$, those who reported daily interactions with mostly non-Middle Eastern students $X^2 (1, N=390)=10.317, p= .006$, those who had a healthcare provider $X^2 (1, N=385)= 19.586, p <.001$, those who had a gynecologist or access to a women's health center $X^2 (1, N=385)= 21.471, p <.001$, and those who obtained health information from the Internet $X^2 (1, N=399)= 11.887, p= .001$, and those who obtained health information from television $X^2 (1, N=399)= 11.260, p= .001$.

Partaking in physical activity/exercise to lose weight is significantly associated with father's education, belonging to student organizations, having a healthcare provider, having a gynecologist or access to a women's health center, and obtaining health information from the Internet and television. Partaking in physical activity/exercise to lose weight is higher among those whose fathers did not attend college $X^2 (1, N=400)= 5.899, p= .015$, those who belong to student organizations $X^2 (1, N=404)= 4.869, p=$

.027, those who have a healthcare provider, those who have a gynecologist or access to a women's health center $X^2 (1, N=387)= 10.712, p = .001$, and those who report obtaining health information from the Internet $X^2 (1, N=404)= 8.111, p= .004$, and those who obtain health information from television $X^2 (1, N=404)= 6.445, p= .011$.

Partaking in physical activity/exercise to not gain weight was significantly associated with student status, father's education, belonging to student organizations, having a health care provider, having a gynecologist or access to a women's health center, and obtaining health information from the Internet and television. Partaking in physical activity/exercise to not gain weight was higher among graduate students $X^2 (1, N=383)= 7.662, p= .006$, those whose father did not attend college $X^2 (1, N=400)= 7.543, p= .006$, students who belong to student organizations $X^2 (1, N=404)= 3.853, p= .050$, those who had a healthcare provider $X^2 (1, N=387)= 6.988, p= .008$, those who had a gynecologist or access to a women's health center $X^2 (1, N=387)= 16.949, p < .001$, and those who obtained health information from television $X^2 (1, N=404)= 4.607, p= .032$.

Partaking in physical activity/exercise for recreation was significantly associated with reported daily interactions, having a healthcare provider, having a gynecologist or access to a women's health center, and obtaining health information from the Internet. Partaking in physical activity/exercise for recreation was higher among those who interact daily with mostly non-Middle Eastern students $X^2 (2, N=395)= 12.237, p= .002$, have a healthcare provider $X^2 (1, N=387)= 8.62, p= .003$, those who gave a gynecologist or have access to a women's health center $X^2 (1, N=387)= 4.619, p= .032$, and those who obtain health information from the Internet $X^2 (1, N=404)= 7.078, p= .008$.

Table 25

Bivariate analysis of the associations between physical activity/exercise and the categorical study predictors, using chi-square

Variable	Categories	Partake in physical activity		To lose weight		To avoid gaining weight		For recreation	
		%	X ² (P)	%	X ² (P)	%	X ² (P)	%	X ² (P)
US born	No	38.0%	.011	20.3%	.138	14.7%	.059	18.4%	.663
	Yes	37.3%	(.918)	18.4%	(.711)	15.8%	(.808)	14.5%	(.415)
Parents live in NJ	No	31.2%	2.652	14.4%	2.711	15.3%	.044	11.7%	3.785
	Yes	40.1%	(.103)	21.7%	(.100)	14.5%	(.833)	20.0%	(.052)
Student attendance status	Full time	37.6%	.000	20.1%	.195	14.4%	.923	18.9%	2.328
	Part time	37.5%	(.991)	17.5%	(.659)	19.3%	(.337)	10.5%	(.127)
Student status	Undergrad	35.0%	4.343	18.2%	1.767	12.4%	7.662	17.9%	.011
	Graduate	48.0%	(.037)	25.0%	(.184)	25.0%	(.006)	18.4%	(.918)
Full-time work	No	36.9%	.385	19.6%	.000	14.0%	.775	18.2%	.342
	Yes	40.9%	(.535)	19.7%	(.992)	18.2%	(.379)	15.2%	(.559)
Single	No	43.0%	2.124	23%	1.171	17.2%	.873	17.2%	.873
	Yes	35.3%	(.145)	18.3%	(.279)	13.6%	.350	13.6%	(.350)
Mother_college	No	34.1%	1.610	16.2%	2.386	13.8%	.235	18.0%	.006
	Yes	40.4%	(.205)	22.4%	(.122)	15.5%	(.628)	17.7%	(.940)
Father_college	No	52.5%	6.485	31.1%	5.899	26.2%	7.543	26.2%	3.545
	Yes	35.1%	(.011)	17.7%	(.015)	12.7%	(.006)	16.2%	(.060)
Immigrated to US education	No	39.8%	.751	22.5%	1.718	2.7%	.864	17.9%	.025
	Yes	35.5%	(.386)	17.3%	(.190)	16.0%	(.353)	17.3%	(.875)
Immigrated to US socioeconomic	No	40.1%	.737	40.1%	.737	16.4%	1.411	17.1%	1.164
	Yes	35.8%	(.391)	35.8%	(.391)	21.3%	(.235)	13.2%	(.281)
Religion	Christian	33.1%	1.346	16.5%	.913	13.4%	.242	13.4%	2.447
	Muslim	39.1%	(.246)	20.6%	.339	15.3%	(.623)	19.8%	(.118)
Belongs to Student Organizations	No	32.7%	6.504	16.3%	4.869	12.0%	3.835	15.5%	2.113
	Yes	45.5%	(.011)	25.3%	(.027)	19.2%	(.050)	21.2%	.146
Belongs to Relig. Organizations	No	35.1%	1.620	19.1%	.103	12.4%	3.180	17.2%	.065
	Yes	41.6%	(.203)	20.4%	(.748)	19.0%	(.075)	18.2%	(.799)
Daily interactions	Mostly ME	25.7%	10.317	15.6%	2.261	13.8%	1.070	9.2%	12.237
	Mostly non-M.E.	45.9%	(.006)	18.8%	(.323)	17.8%	(.586)	27.7%	(.002)
	Equal mix of both	41.0%		22.7%		13.5%		17.8%	
Health Insurance	No	36.0%	.006	15.4%	.254	3.8%	2.500	19.2%	.136
	Yes	36.8%	(.937)	19.4%	(.614)	15.1%	(.114)	16.4%	(.712)
Have Health Care Provider (HCP)	No	19.8%	19.586	10.6%	8.405	7.1%	6.988	8.8%	8.623
	Yes	43.8%	(<.001)	23.5%	(.004)	17.4%	(.008)	21.4%	(.003)
Have seen HCP past 12 months	No	35.2%	.239	20.8%	.112	12.3%	.638	16.0%	.253
	Yes	37.9%	(.625)	19.2%	(.738)	15.5%	(.425)	18.2%	(.615)
Have Gynecologist /Access to WHC	No	25.3%	21.471	12.8%	10.712	6.9%	16.949	13.3%	4.619
	Yes	47.8%	(<.001)	25.8%	(.001)	21.5%	(<.001)	21.5%	(.032)
Ever unable to visit Gyn/WHC past 12 months	No	37.9%	.739	19.8%	.007	15.2%	1.743	17.9%	.180
	Yes	28.6%	(.390)	19.0%	(.934)	4.8%	.187	14.3%	(.672)
Health info internet	No	26.9%	11.887	12.6%	8.111	12.6%	.862	11.3%	7.078
	Yes	44.0%	(.001)	24.1%	(.004)	15.9%	(.353)	21.6%	(.008)
Health info family/friends	No	38.8%	.132	15.9%	1.244	13.1%	.270	19.6%	.423
	Yes	36.8%	(.716)	20.9%	(.265)	15.2%	(.604)	16.8%	(.515)
Health info television	No	35.5%	11.260	18.4%	6.445	13.8%	4.607	17.1%	1.052
	Yes	73.7%	(.001)	42.1%	(.011)	31.6%	(.032)	26.3%	(.305)

Note. ME=Middle Eastern

Bivariate analysis also included independent samples t-tests as shown in Table 26 to examine the differences in continuous predictors (age and sociocultural factors) by reported high intake of sugary drinks (yes vs. no). Statistically significant differences were found in age, acculturation heritage score, acculturation mainstream score, perceived stress score, perceived discrimination, attitudes toward women, beliefs toward sexuality, and religiosity. Participants who reported having had high intake of sugary drinks had mean age of 21 $t(380) = -3.296, p = 0.001$, had significantly higher levels of acculturation-mainstream $t(375) = 6.824, p < 0.001$, higher perceived stress score $t(385) = -2.563, p = 0.011$, lower perceived discrimination score $t(383) = 4.057, p < 0.001$, higher attitudes toward women score $t(363) = -7.097, p < 0.001$, lower beliefs toward sexuality score $t(368) = 2.804, p = 0.005$, and lower religiosity score $t(378) = 3.606, p < 0.001$.

Bivariate analysis also included independent samples t-tests as shown in Table 26 to examine the differences in continuous predictors (age and sociocultural factors) by reported trying to lose weight (yes vs. no). Statistically significant differences were found in the perceived stress score. Participants who reported trying to lose weight had higher level of perceived stress $t(382) = 2.846, p = 0.005$.

Bivariate analysis also included independent samples t-tests as shown in Table 26 to examine the differences in continuous predictors (age and sociocultural factors) by reported trying to maintain weight (yes vs. no). Statistically significant differences were found in acculturation mainstream score and perceived stress score. Participants who reported trying to maintain weight had higher levels of acculturation mainstream $t(373) = -3.140, p = .002$ and higher levels of perceived stress score $t(384) = 2.048, p = 0.041$.

Table 26

Bivariate analysis of the associations between nutrition and demographic and sociocultural factors (continuous predictors), using t-test

Variables	High Intake of Sugary Drinks		t(p)	Trying to lose weight		t(p)	Trying to maintain weight		t(p)
	No	Yes		No	Yes		No	Yes	
	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)		Mean (SD)	Mean SD)	
Age	20.15 (3.44)	21.58 (4.92)	-3.296 (.001)	20.84 (4.51)	21.00 (4.31)	.341 (.733)	20.59 (3.99)	21.41 (4.95)	1.794 (.074)
Acculturation-Heritage Score	17.32 (6.66)	18.38 (7.34)	-1.479 (.140)	17.85 (7.18)	17.89 (6.84)	.057 (.955)	18.02 (7.03)	17.55 (7.02)	-.639 (.523)
Acculturation-Mainstream	22.39 (6.53)	18.23 (5.21)	6.824 (< .001)	20.77 (6.53)	19.76 (5.92)	-1.531 (.127)	21.15 (6.37)	19.09 (5.94)	-3.140 (.002)
Perceived Stress Scale	7.60 (2.71)	8.31 (2.71)	-2.563 (.011)	7.59 (2.59)	8.39 (2.84)	2.846 (.005)	7.73 (2.74)	8.31 (2.69)	2.048 (.041)
Social Support	17.46 (2.71)	17.60 (2.68)	-.533 (.594)	17.75 (2.52)	17.22 (2.90)	-1916 (.056)	17.47 (2.73)	17.57 (2.65)	.355 (.723)
Perceived Discrimination	30.47 (7.18)	27.63 (6.51)	4.057 (< .001)	28.52 (7.13)	29.66 (6.81)	1.58 (.114)	29.52 (7.49)	28.44 (6.21)	-1.493 (.136)
Attitudes Toward Women	42.23 (10.60)	48.98 (7.11)	-7.097 (< .001)	44.92 (9.69)	46.35 (9.65)	1.378 (.169)	45.11 (10.06)	45.98 (9.14)	.839 (.402)
Beliefs Toward Sexuality	22.82 (4.80)	21.49 (4.29)	2.804 (.005)	22.18 (4.68)	22.13 (4.52)	-.107 (.915)	21.93 (4.71)	22.58 (4.41)	1.323 (.187)
Religiosity	14.03 (2.52)	13.03 (2.84)	3.606 (< .001)	13.59 (2.80)	13.45 (2.64)	-.500 (.614)	13.48 (2.63)	13.67 (2.84)	.662 (.509)

Bivariate analysis also included independent samples t-tests as shown in Table 27 to examine the differences in continuous predictors (age and sociocultural factors) by reported partaking in physical activity/exercise (yes vs. no). Statistically significant differences were found in age, acculturation mainstream score, perceived discrimination score, attitude towards women score, beliefs toward sexuality, and religiosity.

Participants who reported partaking in physical activity/exercise had a mean age of 22

$t(381) = -3.411, p = 0.001$, higher levels of acculturation mainstream $t(373) = 5.589, p <$

0.001 , lower perceived discrimination score $t(382) = 3.827, p < 0.001$, lower beliefs

toward sexuality score $t(366) = 2.788, p = .006$, and lower religiosity score $t(376) = 3.359, p = 0.001$.

Bivariate analysis also included independent samples t-tests as shown in Table 27 to examine the differences in continuous predictors (age and sociocultural factors) by reported trying to lose weight (yes vs. no). Statistically significant differences were found in acculturation mainstream scores, perceived stress score, attitudes toward women score, beliefs toward sexuality, and religiosity. Participants reported higher levels of acculturation mainstream

$t(375) = 3.756, p < 0.001$; higher perceived stress score $t(386) = -2.122, p = 0.034$, higher attitudes toward women score $t(363) = -3.504, p = 0.001$, lower beliefs toward sexuality $t(368) = 2.255, p = .025$, and lower religiosity score $t(378) = 3.676, p < 0.001$.

Bivariate analysis also included independent samples t-tests (as shown in Table 27) to examine the differences in continuous predictors (age and sociocultural factors) by reported trying to not gain weight (yes vs. no). Statistically significant differences were found in age and acculturation mainstream score. Participants reported mean age of 23 $t(385) = -3.566, p < 0.001$ and higher acculturation mainstream score $t(375) = 3.819, p < 0.001$

Bivariate analysis also included independent samples t-tests as shown in Table 27 to examine the differences in continuous predictors (age and sociocultural factors) by reported exercise/physical activity for recreation (yes vs. no). Statistically significant differences were found in acculturation mainstream score, perceived discrimination score, attitudes toward women score, and religiosity. Participants reported higher levels

of acculturation mainstream $t(375) = 3.219, p = 0.001$, lower perceived discrimination score $t(384) = 3.410, p = 0.001$, and lower religiosity score $t(378) = 2.734, p = 0.007$.

Table 27

Bivariate analysis of the associations between physical activity and demographic and sociocultural factors (continuous predictors), using t-test

Variables	Partake in Physical Exercise		t(p)	To Lose Weight		t(p)	To not Gain Weight		t(p)	For Recreation		t(p)
	No	Yes		No	Yes		No	Yes		No	Yes	
	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	
Age	20.34 (3.58)	21.92 (5.43)	-3.411 (.001)	20.79 (4.58)	21.48 (3.55)	-1.203 (.230)	20.60 (3.84)	22.82 (6.57)	-3.566 (<.001)	20.80 (4.27)	21.51 (4.98)	-1.205 (.229)
Acculturation -Heritage Score	17.87 (7.19)	17.83 (6.75)	.059 (953)	17.94 (7.22)	17.45 (6.12)	.544 (.587)	17.86 (7.10)	17.76 (6.57)	.092 (.927)	17.77 (7.12)	18.20 (6.52)	-.449 (.654)
Acculturation -Mainstream	21.67 (6.44)	18.06 (5.26)	5.589 (<.001)	20.92 (6.36)	17.88 (5.23)	3.796 (<.001)	20.82 (6.26)	17.34 (5.50)	3.819 (<.001)	20.81 (6.35)	18.11 (5.36)	3.219 (.001)
Perceived Stress Scale	7.76 (2.69)	8.28 (2.78)	-1.794 (.074)	7.81 (2.67)	8.55 (2.90)	-2.122 (.034)	7.93 (2.78)	8.11 (2.43)	-.438 (.662)	7.91 (2.73)	8.21 (2.76)	-.826 (.409)
Social Support	17.41 (2.70)	17.75 (2.68)	-1.152 (.250)	17.51 (2.70)	17.56 (2.67)	-.138 (.890)	17.50 (2.75)	17.63 (2.33)	-.315 (.753)	17.42 (2.72)	17.99 (2.57)	-1.550 (.122)
Perceived Discrimination	30.05 (7.05)	27.25 (6.61)	3.827 (<.001)	29.35 (7.01)	27.86 (6.92)	1.664 (.097)	29.22 (7.07)	28.05 (6.61)	1.153 (.250)	29.60 (7.01)	26.41 (6.42)	3.410 (.001)
Attitudes Toward Women	43.70 (10.13)	8.99 (7.73)	-5.120 (>.001)	44.69 (9.86)	49.23 (7.72)	-3.504 (.001)	45.21 (9.87)	47.29 (8.29)	-1.436 (.152)	44.55 (9.95)	50.28 (6.32)	-4.322 (<.001)
Beliefs Toward Sexuality	22.63 (4.51)	21.26 (4.63)	2.788 (.006)	22.43 (4.61)	21.08 (4.46)	2.255 (.025)	22.33 (4.54)	21.19 (4.90)	16.672 (.095)	22.34 (4.58)	21.30 (4.66)	1.638 (.102)
Religiosity	13.89 (2.446)	12.92 (3.08)	3.359 (.001)	13.79 (2.56)	12.51 (3.15)	3.676 (<.001)	13.63 (2.66)	13.00 (3.05)	1.598 (.111)	13.71 (2.63)	12.71 (3.03)	2.734 (.007)

Using multivariate analysis, we examined the predictors for intake of sugary drinks, including the individual, sociocultural and access to care factors as shown in Table 28. In the first predictive model, individual factors explained somewhere between 19.6% and 26.1% of the variability in the intake of sugary drinks $X^2 (15, N= 322), p < .001$. In this model, intake of sugary drinks was statistically associated with age ($p = .027$), father's education ($p < .001$), and belonging to student organizations ($p < .001$).

The odds of having high intake of sugary drinks were 14% higher among younger students (< 21 years) (*aOR*: 1.136; 95% *CI*: 1.014 - 1.272), and 3 times higher among those who reported belonging to student organizations (*aOR*: 3.063; 95% *CI*: 1.762 - 5.324). In contrast, the odds of having high intake of sugary drinks were 81% lower in Middle Eastern college women whose fathers attended college (*aOR*: .191; 95% *CI*: .080 - .455). High intake of sugary drinks was not significantly associated with the remaining predictors tested in this model.

In the second model, sociocultural factors explained somewhere between 16.5% and 22.0% of the variability in the intake of sugary drinks χ^2 (8, N= 331) = 59.676, $p < .001$. In this model, the intake of sugary drinks was statistically associated with acculturation-mainstream ($p = .016$) and attitudes towards women ($p < .001$). The odds of having high intake of sugary drinks were 8% higher with higher attitude towards women scores (*aOR*: 1.080; 95% *CI*: 1.034 - 1.128). In contrast, the odds of having high intake of sugary drinks were 6% lower with lower acculturation-mainstream levels (*aOR*: .936; 95% *CI*: .887 - .988). High intake of sugary drinks was not significantly associated with the remaining predictors tested in this model.

In the third predictive model, access to care predictors explained somewhere between 10.4% and 13.9% of the variability of the intake of sugary drinks χ^2 (6, N= 384) = 42.275, $p < .001$). In this model, the intake of sugary drinks was statistically associated with having a HCP ($p < .001$), obtaining health information from the Internet ($p = .006$), and obtaining health information from the television ($p = .037$). The odds of having high intake of sugary drinks were 3 times higher among those who have a HCP

(*aOR*: 2.962; 95% *CI*: 1.718 - 5.106), 92% higher among those who obtain health information from the Internet (*aOR*: 1.929; 95% *CI*: 1.203 - 3.093), and 91% higher among those who obtain health information from the television (*aOR*: 3.910; 95% *CI*: 1.082 - 14.131). High intake of sugary drinks was not significantly associated with the remaining predictors tested in this model

Table 28

Logistic regression analysis of predictors of intake of sugary drinks

<div><div></div><div>Predictors</div></div>	Criterion Variables	Intake of Sugary Drinks						
		B	SE	Wald	df	Sig.	Exp(B)	95% CI
Individual Predictors (N=322)								
Age (<i>M</i> =21)		.128	.058	4.869	1	.027	1.136	1.014-1.272
US born (<i>Yes vs. No</i>)		.231	.321	.517	1	.472	1.259	.671-2.362
Parents reside in NJ (<i>Yes vs. No</i>)		.606	.312	3.768	1	.052	1.833	.994-3.381
Student attendance status: (<i>Full time vs. Part time</i>)		.607	.484	1.573	1	.210	1.835	.711-4.740
Student enrollment status (<i>Under Graduate vs. Graduate</i>)		.032	.441	.005	1	.943	1.032	.435-2.449
Full time work status (<i>Yes vs. No</i>)		-.207	.471	.192	1	.661	.813	.323-2.049
Single status (<i>Yes vs. No</i>)		-.056	.311	.033	1	.857	.945	.514-1.739
Mother attended college: (<i>Yes vs. No</i>)		.334	.274	1.489	1	.222	1.396	.817-2.387
Father attended college: (<i>Yes vs. No</i>)		-1.655	.442	14.016	1	<.001	.191	.080-.455
Immigrated to US-education: (<i>Yes vs. No</i>)		-.495	.266	3.450	1	.063	.610	.362-1.028
Immigrated to US-socioeconomic: (<i>Yes vs. No</i>)		-.389	.281	1.908	1	.167	.678	.391-1.177
Religion (<i>Christian vs. Muslim</i>)		-.548	.292	3.525	1	.060	.578	.326-1.024
Belongs to student organizations (<i>Yes vs. No</i>)		1.119	.282	15.748	1	<.001	3.063	1.762-5.324
Belongs to religious organizations (<i>Yes vs. No</i>)		.079	.268	.087	1	.768	1.083	.640-1.832
Daily interactions (<i>mostly ME, Mostly non-ME, an equal mix of both</i>)		-.148	.158	.873	1	.350	.862	.632-1.176
Constant		-1.313	1.424	.850	1	.357	.269	
Omnibus Tests of Model Coefficients	Chi-square=70.091; df=15; P<.001							
Model Summary	-2 Log likelihood=376.295; Cox & Snell R ² =19.6%;NagelkerkeR ² =26.1%							
Sociocultural Predictors (N=331)								
Acculturation - Heritage		.009	.022	.188	1	.665	1.010	.967-1.054

Acculturation - Mainstream	-.066	.027	5.755	1	.016	.936	.887-.988
Perceived Stress	.030	.058	.273	1	.601	1.031	.920-1.154
Social Support	-.016	.057	.077	1	.781	.984	.880-1.101
Perceived Discrimination	-.008	.023	.114	1	.735	.992	.948-1.039
Attitude Towards Women	.077	.022	12.229	1	<.001	1.080	1.034-1.128
Beliefs Toward Sexuality	.056	.039	2.091	1	.148	1.058	.980-1.141
Religiosity	.002	.057	.001	1	.973	1.002	.895-1.121
Constant	-3.475	2.287	2.310	1	.129	.031	
Omnibus Tests of Model Coefficients	Chi-square=59.676 df=8; P<.001						
Model Summary	-2 Log likelihood=398.942; Cox & Snell R ² =16.5%; Nagelkerke R ² =22.0%						
Access to Healthcare (N=384)							
Health Insurance (Yes vs. No)	-.459	.461	.993	1	.319	.632	.256-1.559
Have Healthcare Provider (HCP) (Yes vs. No)	1.086	.278	15.264	1	<.001	2.962	1.718-5.106
Have seen HCP in past 12 months (Yes vs. No)	-.396	.278	2.028	1	.154	.673	.390--1.161
Obtain health information from Internet (Yes vs. No)	.657	.241	7.442	1	.006	1.929	1.203-3.093
Obtain health information from family/friends (Yes vs. No)	-.362	.272	1.779	1	.182	.696	.409-1.185
Obtain health information from television (Yes vs. No)	1.364	.655	4.328	1	.037	3.910	1.082-14.131
Constant	-.285	.511	.310	1	.578	.752	
Omnibus Tests of Model Coefficients	Chi-square=42.275 df=6; P<.001						
Model Summary	-2 Log likelihood=489.968; Cox & Snell R ² =10.4%; Nagelkerke R ² =13.9%						

Note. ME=Middle Eastern

Using multivariate analysis, we examined the predictors for trying to lose weight, including the individual, sociocultural, and access to care factors, as shown in Table 29. In the first predictive model, individual factors explained somewhere between 3.4% and 4.5% of the variability in trying to lose weight $X^2 (15, N= 322) = 10.893, p = .760$. In this model, trying to lose weight was not significantly associated with any of the individual predictors.

In the second model, sociocultural factors explained somewhere between 4.8% and 6.5% of the variability in trying to lose weight $X^2 (8, N= 331) = 16.189, p = .040$. In this model, trying to lose weight was statistically associated with acculturation-mainstream ($p = .035$) and perceived discrimination ($p = .037$). The odds of trying to lose

weight were 5.6% higher with lower levels of acculturation-mainstream (*aOR*: 1.056; 95% *CI*: 1.004 - 1.111). In contrast, the odds of trying to lose weight 5% were lower with higher perceived discrimination scores (*aOR*: .953; 95% *CI*: .911 - .997). Trying to lose weight was not significantly associated with the remaining predictors tested in this model.

In the third predictive model, access to care predictors explained somewhere between 1.3% and 1.7% of the variability of trying to lose weight X^2 (6, N= 384) = 5.015, $p = .542$. Trying to lose weight was not significantly associated with any of the Access to Healthcare predictors.

Table 29

Logistic regression analysis of predictors of trying to lose weight

Predictors	Criterion Variables	Trying to Lose Weight						
		B	SE	Wald	df	Sig.	Exp(B)	95% CI
Individual Predictors (N=318)								
Age (<i>M=21</i>)		-.014	.036	.148	1	.701	.986	.920-1.058
US born (<i>Yes vs. No</i>)		-.324	.302	1.154	1	.283	.723	.400-1.306
Parents reside in NJ (<i>Yes vs. No</i>)		-.003	.291	.000	1	.991	.997	.563-1.764
Student attendance status: (<i>Full time vs. Part time</i>)		.272	.465	.341	1	.559	1.312	.527-3.265
Student enrollment status (<i>Under Graduate vs. Graduate</i>)		-.044	.389	.013	1	.909	.957	.446-2.051
Full time work status (<i>Yes vs. No</i>)		.149	.443	.113	1	.736	1.161	.487-2.767
Single status (<i>Yes vs. No</i>)		-.006	.290	.000	1	.983	.994	.563-1.754
Mother attended college: (<i>Yes vs. No</i>)		.033	.254	.016	1	.898	1.033	.628-1.701
Father attended college: (<i>Yes vs. No</i>)		.546	.362	2.273	1	.132	1.727	.849-3.513
Immigrated to US-education: (<i>Yes vs. No</i>)		-.034	.246	.019	1	.889	.966	.596-1.566
Immigrated to US-socioeconomic: (<i>Yes vs. No</i>)		-.326	.262	1.539	1	.215	.722	.432-1.208
Religion (<i>Christian vs. Muslim</i>)		.205	.269	.582	1	.445	1.228	.725-2.081
Belongs to student organizations (<i>Yes vs. No</i>)		-.208	.261	.634	1	.426	.812	.487-1.355

Belongs to religious organizations <i>(Yes vs. No)</i>	.016	.251	.004	1	.948	1.017	.622-1.662
Daily interactions <i>(mostly ME, Mostly non-ME, an equal mix of both)</i>	.246	.147	2.777	1	.096	1.279	.958-1.707
Constant	-.451	1.213	.138	1	.710	.637	
Omnibus Tests of Model Coefficients	Chi-square=10.893; df=15; P=.760						
Model Summary	-2 Log likelihood=420.734; Cox & Snell R ² =3.4%;NagelkerkeR ² =4.5%						
Sociocultural Predictors (N=328)							
Acculturation - Heritage	-.016	.021	.578	1	.447	.984	.944-1.026
Acculturation - Mainstream	.054	.026	4.424	1	.035	1.056	1.004-1.111
Perceived Stress	-.090	.055	2.677	1	.102	.913	.820-1.018
Social Support	.009	.054	.030	1	.863	1.009	.908-1.122
Perceived Discrimination	-.408	.023	4.370	1	.037	.953	.911-.997
Attitude Towards Women	.002	.021	.008	1	.928	1.002	.962-1.043
Beliefs Toward Sexuality	.024	.037	.413	1	.521	1.024	.952-1.102
Religiosity	-.006	.056	.011	1	.918	.994	.891-1.110
Constant	.969	2.210	.192	1	.661	2.636	
Omnibus Tests of Model Coefficients	Chi-square=16.189 df=8; P=.040						
Model Summary	-2 Log likelihood=427.477; Cox & Snell R ² =4.8%; Nagelkerke R ² =6.5%						
Access to Healthcare (N=383)							
Health Insurance <i>(Yes vs. No)</i>	-.504	.455	1.224	1	.269	.604	.247-1.475
Have Healthcare Provider (HCP) <i>(Yes vs. No)</i>	-.196	.261	.568	1	.451	.822	.493-1.370
Have seen HCP in past 12 months <i>(Yes vs. No)</i>	.132	.265	.247	1	.619	1.141	.678-1.919
Obtain health information from Internet <i>(Yes vs. No)</i>	-.290	.237	1.499	1	.221	.748	.470-1.191
Obtain health information from family/friends <i>(Yes vs. No)</i>	.177	.261	.463	1	.496	1.194	.716-1.990
Obtain health information from television <i>(Yes vs. No)</i>	-.108	.511	.045	1	.833	.898	.330-2.445
Constant	.892	.502	3.155	1	.076	2.439	
Omnibus Tests of Model Coefficients	Chi-square=5.015 df=6; P=.542						
Model Summary	-2 Log likelihood=516.179; Cox & Snell R ² =1.3%; Nagelkerke R ² =1.7%						

Note. ME=Middle Eastern

Using multivariate analysis, we examined the predictors for trying to maintain weight, including individual, sociocultural and access to care factors, as shown in Table 30. In the first predictive model, individual factors explained somewhere between 5.7% and 7.7% of the variability in trying to maintain weight $X^2(15, N=321)=18.992$ $p=.214$). In this model, trying to maintain weight was not significantly associated with any of the individual predictors.

In the second model, sociocultural factors explained somewhere between 5.1% and 6.8% of the variability in trying to maintain weight $\chi^2 (8, N= 329) = 17.086, p = .029$. In this model, trying to lose weight was statistically associated with acculturation-mainstream ($p = .009$). The odds of trying to maintain weight were 7% higher with lower levels of acculturation-mainstream ($aOR: 1.071; 95\% CI: 1.017 - 1.127$). Trying to maintain weight was not significantly associated with the remaining predictors tested in this model.

In the third predictive model, Access to Healthcare predictors explained somewhere between 3.5% to 4.8% of the variability in trying to maintain weight $\chi^2 (6, N= 329) = 13.864, p = .031$. In this model, trying to maintain weight was statistically associated with having a healthcare provider ($p = .006$). The odds of trying to maintain weight were 53% lower among Middle Eastern college women who did not have a healthcare provider ($aOR: .469; 95\% CI: .274 - .801$). Trying to maintain weight was not statistically associated with the remaining predictors tested in this model.

Table 30

Logistic regression analysis of predictors trying to maintain weight

Predictors	Criterion Variables	Trying to Maintain Weight						
		B	SE	Wald	df	Sig.	Exp(B)	95% CI
Individual Predictors (N=321)								
Age (<i>M=21</i>)		-.042	.037	1.254	1	.263	.959	.892-1.032
US born (<i>Yes vs. No</i>)		-.044	.299	.021	1	.884	.957	.533-1.720
Parents reside in NJ (<i>Yes vs. No</i>)		-.559	.299	3.495	1	.062	.572	.318-1.027
Student attendance status: (<i>Full time vs. Part time</i>)		-.636	.444	2.052	1	.152	.529	.222-1.264
Student enrollment status (<i>Under Graduate vs. Graduate</i>)		-.452	.390	1.348	1	.246	.636	.296-1.365
Full time work status (<i>Yes vs. No</i>)		.460	.447	1.062	1	.303	1.585	.660-3.802
Single status (<i>Yes vs. No</i>)		-.105	.293	.129	1	.719	.900	.507-1.599
Mother attended college:		-.097	.256	.145	1	.703	.907	.549-1.498

<i>(Yes vs. No)</i>							
Father attended college: <i>(Yes vs. No)</i>	-.308	.364	.719	1	.396	.735	.360-1.498
Immigrated to US-education: <i>(Yes vs. No)</i>	-.172	.250	.473	1	.492	.842	.516-1.375
Immigrated to US-socioeconomic: <i>(Yes vs. No)</i>	.365	.259	1.982	1	.159	1.440	.867-2.393
Religion <i>(Christian vs. Muslim)</i>	-.302	.276	1.198	1	.274	.739	.431-1.269
Belongs to student organizations <i>(Yes vs. No)</i>	-.395	.264	2.240	1	.135	.674	.402-1.130
Belongs to religious organizations <i>(Yes vs. No)</i>	-.159	.250	.406	1	.524	.853	.522-1.392
Daily interactions <i>(mostly ME, Mostly non-ME, an equal mix of both)</i>	.076	.148	.265	1	.606	1.079	.808-1.442
Constant	3.658	1.239	8.711	1	.003	38.779	
Omnibus Tests of Model Coefficients	Chi-square=18.992; df=15; P=.214						
Model Summary	-2 Log likelihood=417.218; Cox & Snell R ² =5.7%;NagelkerkeR ² =7.7%						
Sociocultural Predictors (N=329)							
Acculturation - Heritage	-.016	.021	.535	1	.464	.985	.944-1.027
Acculturation - Mainstream	.068	.026	6.881	1	.009	1.071	1.017-1.127
Perceived Stress	-.084	.055	2.279	1	.131	.920	.825-1.025
Social Support	-.016	.054	.090	1	.764	.984	.884-1.094
Perceived Discrimination	.026	.023	1.348	1	.246	1.027	.982-1.073
Attitude Towards Women	.017	.021	.649	1	.420	1.017	.976-1.059
Beliefs Toward Sexuality	-.047	.037	1.617	1	.204	.954	.887-1.026
Religiosity	-.030	.056	.277	1	.598	.971	.869-1.084
Constant	.133	2.193	.004	1	.951	1.143	
Omnibus Tests of Model Coefficients	Chi-square=17.086 df=8; P<=.029						
Model Summary	-2 Log likelihood=429.079; Cox & Snell R ² =5.1%; Nagelkerke R ² =6.8%						
Access to Healthcare (N=384)							
Health Insurance <i>(Yes vs. No)</i>	.453	.447	.1.028	1	.311	.1.574	.655-3.780
Have Healthcare Provider (HCP) <i>(Yes vs. No)</i>	-.758	.274	7.670	1	.006	.469	.274-.801
Have seen HCP in past 12 months <i>(Yes vs. No)</i>	-.407	.273	.030	1	.862	.954	.559-1.628
Obtain health information from Internet <i>(Yes vs. No)</i>	.129	.240	.289	1	.591	1.137	.711-1.819
Obtain health information from family/friends <i>(Yes vs. No)</i>	-.039	.270	.021	1	.884	.962	.567-1.631
Obtain health information from television <i>(Yes vs. No)</i>	-.756	.511	2.187	1	.139	.470	.173-1.279
Constant	.540	.503	1.150	1	.284	1.715	
Omnibus Tests of Model Coefficients	Chi-square=13.864 df=6; P=.031						
Model Summary	-2 Log likelihood=504.123; Cox & Snell R ² =3.5%; Nagelkerke R ² =4.8%						

Note. ME=Middle Eastern

Using multivariate analysis, we examined the predictors for partaking in physical activity, including individual, sociocultural, and access to care factors, as shown in Table 31. In the first predictive model, individual factors explained somewhere between 11.6% and 15.7% of the variability in partaking in physical activity $X^2(15, N= 321)= 39.425, p < .001$). In this model, partaking in physical activity was statistically associated with age ($p = .017$). The odds of partaking in physical activity were 13% higher among older students (>12 years) ($aOR: 1.129; 95\% CI: 1.022 - 1.248$). Partaking in physical activity was not statistically associated with the remaining predictors tested in this model.

In the second model, sociocultural factors explained somewhere between 11.8% and 16.3% of the variability in partaking in physical activity $X^2(8, N= 329) = 41.387, p < .001$). In this model, partaking in physical activity was statistically associated with acculturation-heritage ($p = .031$) and acculturation-mainstream ($p = .023$). The odds of partaking in physical activity were 5% lower with lower levels of acculturation-heritage ($aOR: .950; 95\% CI: .907 - .995$). The odds of partaking in physical activity were 6% lower with lower acculturation-mainstream scores ($aOR: .937; 95\% CI: .885 - .991$). Partaking in physical activity was not statistically associated with the remaining predictors tested in this model.

In the third predictive model, access to healthcare predictors explained somewhere between 9% and 12.4% of the variability in partaking in physical activity $X^2(6, N= 329) = 36.493, p < .001$. In this model, partaking in physical activity was statistically associated with having a healthcare provider ($p < .001$), obtaining health information from the Internet ($p = .023$), and obtaining health information from the

Model Summary	-2 Log likelihood=388.828; Cox & Snell R ² =11.6%; NagelkerkeR ² =15.7%						
Sociocultural Predictors (N=329)							
Acculturation - Heritage	-.051	.024	4.633	1	.031	.950	.907-.995
Acculturation - Mainstream	-.066	.029	5.132	1	.023	.937	.885-.991
Perceived Stress	.000	.058	.000	1	1.000	1.000	.892-1.121
Social Support	.001	.057	.001	1	.980	1.001	.895-1.121
Perceived Discrimination	-.031	.023	1.774	1	.183	.969	.926-1.015
Attitude Towards Women	.035	.023	2.394	1	.122	1.036	.991-1.082
Beliefs Toward Sexuality	-.015	.039	.139	1	.710	.986	.913-1.064
Religiosity	-.047	.057	.681	1	.409	.954	.852-1.067
Constant	1.732	2.315	.560	1	.454	5.654	
Omnibus Tests of Model Coefficients	Chi-square=41.387 df=8; P<.001						
Model Summary	-2 Log likelihood=383.191; Cox & Snell R ² =11.8%; Nagelkerke R ² =16.3%						
Access to Healthcare (N=385)							
Health Insurance (Yes vs. No)	-.145	.472	.095	1	.758	.865	.343-2.180
Have Healthcare Provider (HCP) (Yes vs. No)	1.171	.308	14.496	1	<.001	3.226	1.765-5.896
Have seen HCP in past 12 months (Yes vs. No)	-.422	.288	2.142	1	.143	.656	.373-1.154
Obtain health information from Internet (Yes vs. No)	.579	.254	5.185	1	.023	1.784	1.084-2.936
Obtain health information from family/friends (Yes vs. No)	-.201	.275	.537	1	.464	.818	.477-1.401
Obtain health information from television (Yes vs. No)	1.250	.553	5.102	1	.024	3.490	1.180-10.324
Constant	-1.275	.528	5.837	1	.016	.280	
Omnibus Tests of Model Coefficients	Chi-square=36.493 df=6; P<.001						
Model Summary	-2 Log likelihood=468.228; Cox & Snell R ² =9.0%; Nagelkerke R ² =12.4%						

Note. ME=Middle Eastern

Using multivariate analysis, we examined the predictors for exercising to lose weight, including individual, sociocultural, and access to care factors, as shown in Table 32. In the first predictive model, individual factors explained somewhere between 6.2% and 9.8% of the variability in exercising to lose weight $X^2(15, N=324) = 20.695, p = .147$). In this model, exercising to lose weight was statistically associated with father's education ($p = .032$). The odds of exercising to lose weight are 59% lower among Middle Eastern college women whose fathers attended college ($aOR: .410; 95\% CI: .182 - .925$).

Exercising to lose weight was not statistically associated with associated with the remaining predictors tested in this model.

In the second model, sociocultural factors explained somewhere between 8% and 13.2% of the variability in exercising to lose weight X^2 (8, N= 331) = 27.517, $p < .001$). Exercising to lose weight was not significantly associated with any of the sociocultural predictors.

In the third predictive model, Access to Healthcare predictors explained somewhere between 5.1% and 8.1% of the variability in exercising to lose weight X^2 (6, N= 387) = 20.078, $p = .003$). In this model, exercising to lose weight was statistically associated with having a healthcare provider ($p = .016$) and obtaining health information from Internet ($p = .042$). The odds of physical activity to lose weight were over 2 times higher among students who reported having a healthcare provider (aOR : 2.496; 95% CI : 1.185 - 5.254), and 89% higher among those who reported obtaining health information from the Internet (aOR : 1.894; 95% CI : 1.025 - 3.500). Physical activity to lose weight was not significantly associated with the remaining predictors tested in this model.

Table 32

Logistic regression analysis of predictors for exercising to lose weight

<div>Predictors</div>	<div>Criterion Variables</div>	Exercising To Lose Weight						
		B	SE	Wald	df	Sig.	Exp(B)	95% CI
Individual Predictors (N=324)								
Age (<i>M=21</i>)		.013	.040	.101	1	.751	1.013	.936-1.096
US born (<i>Yes vs. No</i>)		.046	.374	.015	1	.901	1.048	.503-2.180
Parents reside in NJ (<i>Yes vs. No</i>)		.363	.382	.905	1	.341	1.438	.608-3.041
Student attendance status: (<i>Full time vs. Part time</i>)		-.310	.562	.305	1	.581	.733	.244-2.205
Student enrollment status (<i>Under</i>		.601	.444	1.835	1	.176	1.824	.764-4.351

Note. ME=Middle Eastern

Using multivariate analysis, we examined the predictors for exercising to avoid gaining weight, including individual, sociocultural, and access to care factors, as shown in Table 33. In the first predictive model, individual factors explained somewhere between 9.1 % and 15.4% of the variability in exercising to avoid gaining weight X^2 (15, $N= 324$, $= 257.883$, $p = .009$). In this model, exercising to avoid gaining weight was statistically associated with student enrollment status ($p = .027$) and father's education ($p = .043$). The odds of exercising to avoid gaining weight were 85% higher among graduate students (aOR : 2.847; 95% CI : 1.126 - 7.198). In contrast, the odds of exercising to avoid gaining weight were 60% lower among Middle Eastern college women who reported their fathers attended college (aOR : .401; 95% CI : .166 - .972). Exercising to avoid gaining weight was not statistically associated with the remaining predictors tested in this model.

In the second model, sociocultural factors explained somewhere between 5.5% and 9.9% of the variability in exercising to avoid gaining weight X^2 (8, $N= 331$) = 18.647, $p = .017$). In this model, exercising to avoid gaining weight was statistically associated with acculturation-mainstream ($p = .001$). The odds of exercising to avoid gaining weight were 13% lower with lower acculturation-mainstream scores (aOR : .869; 95% CI : .798 - .947). Exercising to avoid gaining weight was not statistically associated with the remaining predictors tested in this model.

In the third predictive model, access to healthcare predictors explained somewhere between 2.8% and 5% of the variability in exercising to avoid gaining weight X^2 (6, $N= 387$) = 11.043, $p = .087$). In this model, exercising to avoid gaining weight was

statistically associated with having a healthcare provider ($p = .044$). The odds of exercising to avoid gaining weight were over 2 times higher among Middle Eastern college women who reported having a healthcare provider (aOR : 2.414; 95% CI : 1.024 - 5.689). Physical activity to avoid gaining weight was not significantly associated with the remaining predictors tested in this model.

Table 33

Logistic regression analysis of predictors for exercising to avoid gaining weight

Predictors	Criterion Variables	Exercising To Avoid Gaining Weight						
		B	SE	Wald	df	Sig.	Exp(B)	95% CI
Individual Predictors (N=324)								
Age (<i>M=21</i>)		.080	.046	3.002	1	.082	1.083	.990-1.186
US born (<i>Yes vs. No</i>)		.446	.419	1.134	1	.287	1.562	.688-3.546
Parents reside in NJ (<i>Yes vs. No</i>)		.126	.416	.091	1	.763	1.134	.502-2.564
Student attendance status: (<i>Full time vs. Part time</i>)		-.282	.606	.217	1	.641	.754	.230-2.473
Student enrollment status (<i>Under Graduate vs. Graduate</i>)		1.046	.473	4.889	1	.027	2.847	1.126-7.198
Full time work status (<i>Yes vs. No</i>)		-.481	.594	.656	1	.418	.618	.193-1.980
Single status (<i>Yes vs. No</i>)		-.247	.391	.398	1	.528	.781	.363-1.682
Mother attended college: (<i>Yes vs. No</i>)		.384	.364	1.115	1	.291	1.468	.720-2.994
Father attended college: (<i>Yes vs. No</i>)		-.913	.451	4.096	1	.043	.401	.166-972
Immigrated to US-education: (<i>Yes vs. No</i>)		.306	.355	.746	1	.388	1.359	.678-2.723
Immigrated to US-socioeconomic: (<i>Yes vs. No</i>)		-.218	.351	.383	1	.536	.805	.404-1.601
Religion (<i>Christian vs. Muslim</i>)		-.352	.375	.882	1	.348	.703	.337-1.467
Belongs to student organizations (<i>Yes vs. No</i>)		.412	.359	1.321	1	.250	1.510	.748-3.050
Belongs to religious organizations (<i>Yes vs. No</i>)		.614	.343	3.200	1	.074	1.847	.943-3.618
Daily interactions (<i>mostly ME, Mostly non-ME, an equal mix of both</i>)		-.191	.205	.873	1	.350	.826	.553-1.233
Constant		-3.473	1.625	4.567	1	.033	.031	
Omnibus Tests of Model Coefficients	Chi-square=30.839; df=15; P=.009							
Model Summary	-2 Log likelihood=257.883; Cox & Snell R ² =9.1%; NagelkerkeR ² =15.4%							
Sociocultural Predictors (N=331)								
Acculturation - Heritage		-.021	.031	.466	1	.495	.979	.922-1.040

Acculturation - Mainstream	-.140	.044	10.346	1	.001	.869	.798-.947
Perceived Stress	-.029	.079	.129	1	.719	.972	.832-1.135
Social Support	-.025	.076	.106	1	.744	.975	.840-1.132
Perceived Discrimination	-.014	.031	.205	1	.651	.986	.929-1.047
Attitude Towards Women	-.042	.030	2.012	1	.156	.959	.904-1.016
Beliefs Toward Sexuality	-.035	.050	.483	1	.487	.966	.876-1.065
Religiosity	-.048	.076	.400	1	.527	.953	.822-1.106
Constant	5.625	3.072	3.353	1	.067	277.362	
Omnibus Tests of Model Coefficients	Chi-square=18.647 df=8; P=.017						
Model Summary	-2 Log likelihood=248.202; Cox & Snell R ² =5.5%; Nagelkerke R ² =9.9%						
Access to Healthcare (N=387)							
Health Insurance (Yes vs. No)	1.279	1.045	1.498	1	.221	3.593	.463-27.872
Have Healthcare Provider (HCP) (Yes vs. No)	.881	.437	4.058	1	.044	2.414	1.024-5.689
Have seen HCP in past 12 months (Yes vs. No)	-.014	.392	.001	1	.971	.986	.457-2.127
Obtain health information from Internet (Yes vs. No)	.087	.341	.065	1	.799	1.091	.559-2.129
Obtain health information from family/friends (Yes vs. No)	-.053	.377	.020	1	.889	.948	.453-1.988
Obtain health information from television (Yes vs. No)	.718	.571	1.580	1	.209	2.050	.669-6.280
Constant	-3.763	1.116	11.370	1	.001	.023	
Omnibus Tests of Model Coefficients	Chi-square=11.043 df=6; P=.087						
Model Summary	-2 Log likelihood=305.361; Cox & Snell R ² =2.8%; Nagelkerke R ² =5.0%						

Note. ME=Middle Eastern

Using multivariate analysis, we examined the predictors for exercising for recreation, including individual, sociocultural, and access to care factors, as shown in Table 34. In the first predictive model, individual factors explained somewhere between 6.0% and 9.6% of the variability in exercising for recreation $X^2 (15, N= 324) = 19.934, p = .174$. In this model, exercising for recreation was not significantly associated with any of the individual predictors.

In the second model, sociocultural factors explained somewhere between 7.1% and 11.7% of the variability in exercising for recreation $X^2 (8, N= 331) = 24.223, p = .002$. In this model, exercising for recreation was statistically associated with attitudes

toward women ($p = .021$). The odds of exercising for recreation were 7% higher with higher attitudes towards women scores (aOR : 1.068; 95% CI : 1.010 - 1.130). Physical activity for recreation was not statistically associated with the remaining predictors tested in this model.

In the third predictive model, access to healthcare predictors explained somewhere between 4.0% and 6.7% of the variability in exercising for recreation X^2 (6, $N= 387$) = 15.829, $p = .015$). In this model, exercising for recreation was statistically associated with having a healthcare provider ($p = .012$). The odds of exercising for recreation were 77% higher in Middle Eastern college women who reported having a healthcare provider (aOR : 2.770; 95% CI : 1.245 - 6.159). Physical activity for recreation was not significantly associated with the remaining predictors tested in this model

Table 34

Logistic regression analysis of predictors for exercising for recreation

<div><div></div><div>Criterion Variables</div></div> <div>Predictors</div>	Exercising For Recreation						
	B	SE	Wald	df	Sig.	Exp(B)	95% CI
Individual Predictors (N=324)							
Age (<i>M=21</i>)	.044	.041	1.141	1	.285	1.045	.964-1.134
US born (<i>Yes vs. No</i>)	.097	.394	.061	1	.805	1.102	.510-2.385
Parents reside in NJ (<i>Yes vs. No</i>)	.801	.423	3.592	1	.058	2.228	.973-5.099
Student attendance status: (<i>Full time vs. Part time</i>)	-1.071	.632	2.872	1	.090	.343	.099-1.183
Student enrollment status (<i>Under Graduate vs. Graduate</i>)	.248	.472	.276	1	.599	1.282	.508-3.236
Full time work status (<i>Yes vs. No</i>)	.304	.538	.320	1	.572	1.355	.472-3.889
Single status (<i>Yes vs. No</i>)	.097	.369	.069	1	.793	1.102	.534-2.271
Mother attended college: (<i>Yes vs. No</i>)	.139	.329	.178	1	.673	1.149	.603-2.187
Father attended college: (<i>Yes vs. No</i>)	-.516	.411	1.572	1	.210	.597	.267-1.337
Immigrated to US-education: (<i>Yes vs. No</i>)	.079	.312	.064	1	.801	1.082	.587-1.995
Immigrated to US-socioeconomic:	.174	.326	.284	1	.594	1.190	.628-2.253

(Yes vs. No)							
Religion (Christian vs. Muslim)	.558	.366	2.326	1	.127	1.747	.583-2.094
Belongs to student organizations (Yes vs. No)	.100	.326	.094	1	.760	1.105	.583-2.094
Belongs to religious organizations (Yes vs. No)	-.043	.318	.019	1	.891	.958	.514-1.785
Daily interactions (mostly ME, Mostly non-ME, an equal mix of both)	.203	.187	1.172	1	.279	1.225	.848-1.769
Constant	-3.551	1.547	5.267	1	.022	.029	
Omnibus Tests of Model Coefficients	Chi-square=19.934; df=15; P=.174						
Model Summary	-2 Log likelihood=296.411; Cox & Snell R ² =6.0%; NagelkerkeR ² =9.6%						
Sociocultural Predictors (N=331)							
Acculturation - Heritage	-.050	.030	2.889	1	.089	.951	.897-1.008
Acculturation - Mainstream	-.018	.035	.258	1	.611	.982	.917-1.052
Perceived Stress	-.037	.071	.277	1	.599	.964	.837-1.107
Social Support	.018	.070	.067	1	.796	1.018	.887-1.168
Perceived Discrimination	-.034	.028	1.477	1	.224	.967	.915-1.021
Attitude Towards Women	.066	.029	5.333	1	.021	1.068	1.010-1.130
Beliefs Toward Sexuality	.029	.045	.404	1	.525	1.029	.942-1.125
Religiosity	-.065	.068	.933	1	.334	.937	.821-1.069
Constant	-2.316	2.793	.687	1	.407	.099	
Omnibus Tests of Model Coefficients	Chi-square=24.223 df=8; P=.002						
Model Summary	-2 Log likelihood=282.996; Cox & Snell R ² =7.1%; Nagelkerke R ² =11.7%						
Access to Healthcare (N=387)							
Health Insurance (Yes vs. No)	-.324	.549	.348	1	.555	.723	.247-2.120
Have Healthcare Provider (HCP) (Yes vs. No)	1.019	.408	6.241	1	.012	2.770	1.245-6.159
Have seen HCP in past 12 months (Yes vs. No)	-.295	.355	.691	1	.406	.744	.371-1.493
Obtain health information from Internet (Yes vs. No)	.630	.339	3.458	1	.063	1.878	.967-3.650
Obtain health information from family/friends (Yes vs. No)	-.297	.330	.805	1	.370	.743	.389-1.421
Obtain health information from television (Yes vs. No)	.390	.564	.477	1	.490	1.477	.489-4.462
Constant	-2.105	.645	10.648	1	.001	.122	
Omnibus Tests of Model Coefficients	Chi-square=15.829; df=6; P=.015						
Model Summary	-2 Log likelihood=334.511; Cox & Snell R ² =4.0%; Nagelkerke R ² =6.7%						

Note. ME=Middle Eastern

Experiences of Unwanted Sexual Contact or Injury

Study participants were asked about experiences of unwanted sexual contact or injury in their lifetime. In this sample, 11% reported having been threatened with

attempted physical violence, 10% reported experiencing physical injury, and 17% reported experiencing unwanted sexual contact. Chi-square tests were used to examine the bivariate associations between experiences of unwanted physical contact or injury and the categorical predictors, as shown in Table 35.

Having an intimate partner attempt physical violence is significantly associated with parent's residence and having seen a healthcare provider in the past twelve months. Having an intimate partner attempt physical violence is higher among students whose parents do not reside in New Jersey $X^2 (1, N=395)= 4.755, p= .029$ and among those who have not seen a healthcare provider in the past twelve months $X^2 (1, N= 386)= 5.835, p= .016$.

Having experienced any attempt of intimate partner violence is associated with having been unable to visit a gynecologist or have access to a women's health center in the past twelve months. Having experienced any attempt of intimate partner violence is significantly higher in those who have not been unable to access a gynecologist or women's health center in the past twelve months $X^2 (1, N=395)= 8.307, p= .004$.

Having experienced physical injury in the past year from an intimate partner is significantly associated with having been unable to visit a gynecologist or have access to a women's health center and obtaining health information from family and friends.

Having experienced physical injury in the past year from an intimate partner is higher among those unable to visit a gynecologist or access a women's health center $X^2 (1, N=386)= 46.046, p < .001$, and those who do not obtain health information from family and friends $X^2 (1, N=398)= 4.429, p= .035$. No other remaining predictors were associated with intimate partner violence.

Table 35

Bivariate analysis of the associations between experiences of unwanted sexual contact and injury and the categorical study predictors, using chi-square

Variable	Categories	Ever experienced attempts of physical violence		Ever experienced unwanted sexual contact		Experienced any form of unwanted sexual contact in past year		Experienced physical injury in past year	
		%	X ² (P)	%	X ² (P)	%	X ² (P)	%	X ² (P)
US born	No	10.4%	.063	16.5%	.011	4.7%	1.262	2.2%	.063
	Yes	9.5%	(.802)	16.0%	(.915)	8.0%	(.261)	2.7%	(.801)
Parents live in NJ	No	15.5%	4.755	20.9%	2.199	7.3%	1.177	3.7%	1.309
	Yes	8.1%	(.029)	14.7%	(.138)	4.5%	(.278)	1.7%	(.253)
Student attendance status	Full time	10.0%	.313	16.7%	.077	5.8%	.445	2.4%	.087
	Part time	12.5%	(.576)	18.2%	(.781)	3.6%	(.505)	1.8%	(.767)
Student status	Undergrad	10.6%	.000	15.9%	1.261	5.6%	.009	2.3%	.039
	Graduate	10.7%	(.986)	21.3%	(.261)	5.3%	(.925)	2.7%	(.843)
Full-time work	No	9.7%	.356	15.2%	3.273	5.4%	.088	2.1%	.205
	Yes	12.1%	(.551)	24.2%	(.070)	4.5%	(.767)	3.0%	(.651)
Single	No	8.3%	.507	17.4%	.103	3.3%	1.106	1.7%	.290
	Yes	10.6%	(.476)	16.1%	(.749)	5.8%	(.293)	2.5%	(.590)
Mother_ college	No	13.5%	3.356	17.9%	.242	4.3%	.591	1.9%	.237
	Yes	7.8%	(.067)	16.0%	(.623)	6.1%	(.442)	2.6%	(.627)
Father_ college	No	12.1%	.359	15.8%	.024	5.2%	.002	1.8%	.084
	Yes	9.5%	(.718)	16.6%	.876	5.0%	(.967)	2.4%	(.772)
Immigrated to US education	No	9.4%	.160	15.9%	.105	4.1%	.821	0.6%	3.81
	Yes	10.6%	(.690)	17.1%	(.746)	6.1%	(.365)	3.5%	(.051)
Immigrated to US_ socioeconomic	No	10.5%	.048	15.4%	.232	3.5%	1.395	1.4%	.727
	Yes	9.8%	(.827)	17.3%	(.630)	6.3%	(.238)	2.7%	(.394)
Religion	Christian	7.9%	.503	15.0%	.306	3.9%	.861	0.8%	2.021
	Muslim	10.1%	(.478)	17.2%	(.580)	6.2%	(.353)	3.1%	(.155)
Belongs to Student Organizations	No	12.3%	3.727	16.6%	.000	5.5%	.087	2.0%	.255
	Yes	6.2%	(.054)	16.6%	(.990)	4.8%	(.768)	2.8%	(.613)
Belongs to Relig. Organizations	No	10.3%	.055	18.8%	.025	5.3%	.006	1.9%	.432
	Yes	9.6%	(.814)	16.2%	(.875)	5.1%	(.940)	2.9%	(.511)
Daily interactions	Mostly ME	13.9%	3.896 (.142)	18.5%	.325 (.850)	6.5%	2.461 (.292)	4.6%	3.664 (.160)
	Mostly non-M.E.	12.1%		17.2%		7.1%		1.0%	
	Equal mix of both	7.1%		15.9%		3.3%		1.6%	
Health Insurance	No	7.7%	.195	19.2%	.110	0.0%	1.576	0.0%	.656
	Yes	10.4%	(.659)	16.7%	(.740)	5.7%	(.209)	2.5%	(.418)
Have Health Care Provider (HCP)	No	13.3%	1.663	19.5%	.986	7.1%	.961	2.7%	.094
	Yes	8.9%	(.197)	15.4%	(.321)	4.6%	(.327)	2.1%	(.759)
Have seen HCP past 12 months	No	16.2%	5.835	21.9%	2.823	4.7%	.095	1.9%	.097
	Yes	7.9%	(.016)	14.8%	(.093)	5.5%	(.758)	2.4%	(.755)
Have Gynecologist /Access to WHC	No	10.2%	.001	14.4%	1.267	4.8%	.180	1.6%	.739
	Yes	10.0%	(.970)	18.7%	(.260)	5.7%	(.671)	2.9%	(.390)

Ever unable to visit Gyn/WHC past 12 months	No Yes	9.7% 19.0%	1.924 (.165)	16.1% 28.6%	2.222 (.136)	4.5% 19.0%	8.307 (.004)	1.1% 23.8%	46.046 (<i><.001</i>)
Health info internet	No Yes	12.3% 8.6%	1.45 (.228)	15.7% 17.1%	.144 (.704)	5.2% 5.3%	.002 (.961)	2.0% 2.4%	.102 (.750)
Health info family/friends	No Yes	10.8% 9.8%	.082 (.775)	14.7% 17.2%	.349 (.555)	6.9% 4.7%	.703 .402	5.0% 1.3%	4.429 (.035)
Health info television	No Yes	9.7% 16.7%	.913 (.339)	15.8% 31.6%	3.244 (.072)	5.3% 5.3%	.000 (1.00)	2.4% 0.0%	.462 .497

Note. ME=Middle Eastern

Bivariate analysis also included independent samples t-tests, as shown in Table 36 to examine the differences in continuous predictors (age and sociocultural factors) by reported attempted intimate partner violence by an intimate partner (yes vs. no). Statistically significant differences were found in acculturation mainstream score, perceived stress scale score, social support, perceived discrimination, and attitudes toward women. Participants who reported attempted physical violence by an intimate partner had lower levels of acculturation mainstream $t(374) = -2.851, p = 0.005$, higher perceived stress scores $t(385) = -2.309, p = 0.021$, lower social support scores $t(378) = 5.365, p < 0.00$, higher perceived discrimination scores $t(383) = -2.481, p < 0.001$, and lower attitudes toward women $t(362) = 3.142, p = 0.002$.

Bivariate analysis also included independent samples t-tests (as shown in Table 36) to examine the differences in continuous predictors (age and sociocultural factors) by reported ever-experienced unwanted sexual contact (yes vs. no). Statistically significant differences were found in perceived stress scale, social support scores, and perceived discrimination. Participants reported higher perceived stress scores $t(385) = -3.627, p < 0.001$, lower social support scores $t(378) = 3.928, p < 0.001$, and higher perceived discrimination scores $t(383) = -2.603, p = 0.010$.

Bivariate analysis also included independent samples t-tests, (as shown in Table 36) to examine the differences in continuous predictors (age and sociocultural factors) by

reported having experienced in past year, attempted physical violence or unwanted sexual contact, (yes vs. no). Statistically significant differences were found in perceived stress score, social support, and perceived discrimination. Participants who experienced in past year, attempted physical violence or unwanted sexual contact had higher levels of perceived stress scores $t(386) = -2.868, p = 0.004$, lower social support scores $t(379) = 4.654, p < 0.001$, and higher levels of perceived discrimination $t(384) = -2.774, p = 0.006$.

Bivariate analysis also included independent samples t-tests, (as shown in Table 36) to examine the differences in continuous predictors (age and sociocultural factors) by reported having experienced in past year, physical injury by intimate partner (yes vs. no). Statistically significant differences were found in perceived stress scale and social support. Participants who experienced in past year, physical injury by intimate partner reported higher levels of perceived stress scores $t(385) = -2.397, p = 0.017$ and lower levels of social support $t(378) = 5.259, p < 0.001$

Table 36

Bivariate analysis of the associations between experiences of unwanted sexual contact or injury and demographic and sociocultural factors (continuous predictors), using t-test

Variables	Ever experienced attempted physical violence		t(p)	Ever experienced unwanted sexual contact		t(p)	In past year, experienced unwanted sexual contact		t(p)	In past year, experienced physical injury		t(p)
	No	Yes		No	Yes		No	Yes		No	Yes	
	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	
Age	20.93 (4.60)	20.60 (2.25)	.326 (.744)	20.90 (4.61)	20.90 (3.31)	-.006 (.995)	20.89 (4.39)	21.09 (4.74)	-.202 (.840)	20.84 (4.16)	20.22 (2.59)	.444 (.658)
Acculturation -Heritage Score	17.90 (7.04)	17.03 (6.63)	.741 (.459)	17.74 (7.11)	18.50 (6.53)	-.782 (.435)	17.80 (7.07)	18.68 (5.87)	-.535 (.593)	17.81 (7.03)	19.11 (7.09)	-.547 (.585)
Acculturation -Mainstream	20.06 (6.09)	23.08 (7.01)	-2.851 (.005)	20.16 (6.19)	21.18 (6.66)	-1.172 (.242)	20.21 (6.13)	22.63 (8.35)	-1.643 (.101)	20.31 (6.26)	21.88 (7.41)	-.699 (.485)
Perceived Stress Scale	7.85 (2.76)	8.92 (2.25)	-2.309 (.021)	7.73 (2.79)	9.08 (2.12)	-3.627 (<.001)	7.87 (2.73)	9.65 (2.18)	-2.868 (.004)	7.92 (2.73)	10.11 (2.08)	-2.397 (.017)
Social Support	17.77 (2.56)	15.41 (2.99)	5.365 (<.001)	17.77 (2.60)	16.34 (2.88)	3.928 (<.001)	17.67 (2.60)	14.79 (3.03)	4.654 (<.001)	17.63 (2.63)	13.00 (1.32)	5.259 (<.001)
Perceived Discrimim	28.79 (6.84)	31.74 (7.87)	-2.481 (<.001)	28.63 (6.92)	31.13 (7.15)	-2.603 (.010)	28.82 (6.94)	33.25 (7.08)	-2.774 (.006)	28.98 (6.70)	31.78 (7.85)	-1.181 (.238)
Attitudes Toward Women	45.99 (9.25)	40.72 (11.92)	3.142 (.002)	45.81 (9.56)	44.08 (10.23)	1.280 (.201)	45.61 (9.60)	43.63 (10.99)	.867 (.386)	45.56 (9.62)	43.44 (12.07)	.647 (.518)
Beliefs Toward Sexuality	22.12 (4.48)	22.74 (5.47)	-.779 (.436)	22.12 (4.58)	22.33 (4.76)	-.323 (.747)	22.10 (4.57)	23.25 (5.21)	-1.084 (.279)	22.13 (4.60)	23.56 (4.69)	1.839 (.393)
Religiosity	13.60 (2.56)	13.29 (3.63)	.672 (.502)	13.57 (2.71)	13.35 (2.81)	.594 (.553)	13.54 (2.69)	13.60 (3.33)	-.097 (.922)	13.58 (2.69)	11.89 (3.79)	1.839 (.220)

Using multivariate analysis, we examined the predictors for ever-experiencing attempts of physical violence, including individual, sociocultural, and access to care factors, as shown in Table 37. In the first predictive model, individual factors explained somewhere between 5.8% and 11.8% of the variability in ever experiencing attempts of physical violence $X^2 (15, N= 320) = 19.122, p = .208$. (In this model, ever-experiencing attempts of physical violence were not significantly associated with any of the individual predictors.

In the second model, sociocultural factors explained somewhere between 9.4% and 19% of the variability in ever experiencing attempts of physical violence $X^2 (8, N = 330) = 32.435, p = < .001$. In this model, ever experiencing attempts of physical violence was statistically associated with social support ($p = .004$) and attitudes toward women ($p = .021$). The odds of ever experiencing attempts of physical violence were 22% lower with higher social support scores ($aOR: .785; 95\% CI: .666 - .924$), and 8% lower with higher attitude towards women scores ($aOR: .919; 95\% CI: .856 - .987$). Ever experiencing attempts of physical violence was not statistically associated with the remaining predictors tested in this model.

In the third predictive model, access to healthcare predictors explained somewhere between 2.8% and 5.7% of the variability in ever experiencing attempts of physical violence $X^2 (6, N = 386) = 10.890, p = .092$. In this model, ever experiencing attempts of physical violence was statistically associated with having seen a healthcare provider in past 12 months ($p = .018$). The odds of experiencing attempts of physical violence were 61% lower among Middle Eastern college women who reported having seen a healthcare provider in past 12 months ($aOR: .395; 95\% CI: .184 - .852$). Ever experiencing attempts of physical violence was not statistically associated with the remaining predictors tested in this model.

Access to Healthcare (N=386)							
Health Insurance (<i>Yes vs. No</i>)	.728	.780	.871	1	.351	2.071	.449-9.553
Have Healthcare Provider (HCP) (<i>Yes vs. No</i>)	-.004	.407	.000	1	.993	.996	.449-2.213
Have seen HCP in past 12 months (<i>Yes vs. No</i>)	-.928	.391	5.620	1	.018	.395	.184-.852
Obtain health information from Internet (<i>Yes vs. No</i>)	-.628	.393	2.553	1	.110	.534	.247-1.153
Obtain health information from family/friends (<i>Yes vs. No</i>)	-.531	.438	1.472	1	.225	.588	.249-1.387
Obtain health information from television (<i>Yes vs. No</i>)	1.099	.706	2.422	1	.120	3.002	.752-11.985
Constant	-1.526	.830	3.385	1	.066	.217	
Omnibus Tests of Model Coefficients	Chi-square=10.890; df=6; P=.092						
Model Summary	-2 Log likelihood=246.171; Cox & Snell R ² =2.8%; Nagelkerke R ² =5.7%						

Note. ME=Middle Eastern

Using multivariate analysis, we examined the predictors for experiencing unwanted sexual contact, including individual, sociocultural, and access to care factors, as shown in Table 38. In the first predictive model, individual factors explained somewhere between 4.7% and 7.8% of the variability in ever experiencing unwanted sexual contact $X^2 (15, N= 319) = 15.422, p = .208$. In this model, ever experiencing unwanted sexual contact was significantly associated with work status ($p = .006$). The odds of ever experiencing unwanted sexual contact were 4 times higher among Middle Eastern college women who reported full time work status ($aOR: 4.037; 95\% CI: 1.480 - 11.015$). Ever experiencing unwanted sexual contact was not statistically associated with the remaining predictors tested in this model.

In the second model, sociocultural factors explained somewhere between 9.2% and 15.4% of the variability in ever experiencing unwanted sexual contact $X^2 (8, N= 330) = 31.906, p < .001$. In this model, ever experiencing unwanted sexual contact was statistically associated with higher levels of acculturation-heritage ($p = .003$), perceived stress ($p < .001$), and attitudes towards women scale ($p = .018$). The odds of ever

experiencing unwanted sexual contact were 9% higher with lower levels of acculturation-heritage (*aOR*: 1.087; 95% *CI*: 1.028 - 1.150), and 32% higher with higher perceived stress scores (*aOR*: 1.326; 95% *CI*: 1.142 - 1.539). In contrast, the odds of ever experiencing unwanted sexual contact were 7% lower with higher attitude towards women scores (*aOR*: .934; 95% *CI*: .882 - .989). Ever experiencing attempts of physical violence was not statistically associated with the remaining predictors tested in this model.

In the third predictive model, access to healthcare predictors explained somewhere between 1.1% and 1.9% of the variability in ever experiencing unwanted sexual contact X^2 (6, N= 386) = 4.430, p = .619. In this model, ever experiencing unwanted sexual contact was not statistically associated with any of the access to healthcare predictors.

Table 38

Logistic regression analysis of predictors for ever-experiencing unwanted sexual contact

<div><div></div><div>Criterion Variables</div></div> <div>Predictors</div>	Ever Experiencing Unwanted Sexual Contact						
	B	SE	Wald	df	Sig.	Exp(B)	95% CI
Individual Predictors (N=319)							
Age (<i>M=21</i>)	-.017	.048	.122	1	.727	.983	.895-1.080
US born (<i>Yes vs. No</i>)	.119	.379	.099	1	.754	1.126	.536-2.365
Parents reside in NJ (<i>Yes vs. No</i>)	-.669	.355	3.549	1	.060	.512	.256-1.027
Student attendance status: (<i>Full time vs. Part time</i>)	-1.166	.604	3.723	1	.054	.312	.095-1.019
Student enrollment status (<i>Under Graduate vs. Graduate</i>)	.239	.498	.231	1	.631	1.271	.479-3.372
Full time work status (<i>Yes vs. No</i>)	1.396	.512	7.426	1	.006	4.037	1.480-11.015
Single status (<i>Yes vs. No</i>)	-.115	.374	.095	1	.758	.891	.428-1.855
Mother attended college: (<i>Yes vs. No</i>)	-.064	.332	.037	1	.847	.938	.489-1.797
Father attended college: (<i>Yes vs. No</i>)	.034	.505	.005	1	.946	1.035	.385-2.785

Immigrated to US-education: <i>(Yes vs. No)</i>	.208	.329	.402	1	.526	1.232	.647-2.347
Immigrated to US-socioeconomic: <i>(Yes vs. No)</i>	.106	.347	.093	1	.761	1.112	.563-2.196
Religion <i>(Christian vs. Muslim)</i>	-.059	.349	.028	1	.866	.943	.476-1.867
Belongs to student organizations <i>(Yes vs. No)</i>	-.014	.349	.002	1	.968	.986	.498-1.954
Belongs to religious organizations <i>(Yes vs. No)</i>	-.122	.332	.135	1	.714	.885	.462-1.696
Daily interactions <i>(mostly ME, Mostly non-ME, an equal mix of both)</i>	-.171	.197	.754	1	.385	.843	.574-1.239
Constant	.332	1.563	.045	1	.832	1.394	
Omnibus Tests of Model Coefficients	Chi-square=15.422; df=15; P=.421						
Model Summary	-2 Log likelihood=280.977; Cox & Snell R ² =4.7%; NagelkerkeR ² =7.8%						
Sociocultural Predictors (N=330)							
Acculturation - Heritage	.084	.029	8.593	1	.003	1.087	1.028-1.150
Acculturation - Mainstream	-.035	.033	1.098	1	.295	.966	.905-1.031
Perceived Stress	.282	.076	13.740	1	<.001	1.326	1.142-1.539
Social Support	-.018	.067	.070	1	.792	.983	.862-1.120
Perceived Discrimination	.031	.031	.967	1	.325	1.031	.970-1.096
Attitude Towards Women	-.068	.029	5.552	1	.018	.934	.882-.989
Beliefs Toward Sexuality	-.056	.052	1.165	1	.280	.945	.853-1.047
Religiosity	-.009	.074	.015	1	.903	.991	.858-1.145
Constant	-.923	2.975	.096	1	.756	.398	
Omnibus Tests of Model Coefficients	Chi-square=31.906 df=8; P<.001						
Model Summary	-2 Log likelihood=268.662; Cox & Snell R ² =9.2%; Nagelkerke R ² =15.4%						
Access to Healthcare (N=386)							
Health Insurance <i>(Yes vs. No)</i>	-.072	.538	.018	1	.893	.930	.324-2.672
Have Healthcare Provider (HCP) <i>(Yes vs. No)</i>	-.197	.334	.350	1	.554	.821	.427-1.579
Have seen HCP in past 12 months <i>(Yes vs. No)</i>	-.388	.328	1.394	1	.238	.679	.357-1.292
Obtain health information from Internet <i>(Yes vs. No)</i>	.091	.312	.085	1	.771	1.095	.594-2.018
Obtain health information from family/friends <i>(Yes vs. No)</i>	.157	.354	.196	1	.658	1.170	.584-2.341
Obtain health information from television <i>(Yes vs. No)</i>	.691	.568	1.482	1	.224	1.996	.656-6.073
Constant	-1.332	.607	4.815	1	.028	.264	
Omnibus Tests of Model Coefficients	Chi-square=4.430; df=6; P=.619						
Model Summary	-2 Log likelihood=345.541; Cox & Snell R ² =1.1%; Nagelkerke R ² =1.9%						

Note. ME=Middle Eastern

Using multivariate analysis, we examined the predictors for experiencing unwanted sexual contact in the past 12 months, including individual, sociocultural, and access to care factors, as shown in Table 39. In the first predictive model, individual

factors explained somewhere between 3.0% and 8.4% of the variability in experiencing unwanted sexual contact past 12 Months $\chi^2 (15, N= 320) = 9.849, p = .829$. In this model, experiencing unwanted sexual contact in the past 12 months was not statistically associated with any of the individual predictors.

In the second model, sociocultural factors explained somewhere between 5.3% and 16.6% of the variability in experiencing unwanted sexual contact in past 12 months $\chi^2 (8, N= 331) = 18.169, p = .829$. In this model, experiencing unwanted sexual contact in the past 12 months was not statistically associated with any of the sociocultural predictors.

In the third predictive model, access to healthcare predictors explained somewhere between 1.3% and 3.8% of the variability in experiencing unwanted sexual contact in the past 12 months $\chi^2 (6, N= 380) = 5.100, p = .531$. In this model, experiencing unwanted sexual contact in the past 12 months was not statistically associated with any of the access to healthcare predictors.

Table 39

Logistic regression analysis of predictors for experiencing unwanted sexual contact in the past 12 months

<div><div></div><div>Predictors</div></div>	Criterion Variables	Experiencing unwanted sexual contact in past 12 Months					
	B	SE	Wald	df	Sig.	Exp(B)	95% CI
Individual Predictors (N=320)							
Age (<i>M=21</i>)	.058	.060	.934	1	.334	1.060	.942-1.194
US born (<i>Yes vs. No</i>)	-.563	.558	1.017	1	.313	.570	.191-1.701
Parents reside in NJ (<i>Yes vs. No</i>)	-.517	.561	.851	1	.356	.596	.199-1.789
Student attendance status: (<i>Full time vs. Part time</i>)	-.583	.956	.372	1	.542	.558	.086-3.632
Student enrollment status (<i>Under Graduate vs. Graduate</i>)	-.363	.772	.222	1	.638	.695	.153-3.155

Note. ME=Middle Eastern

Using multivariate analysis, we examined the predictors for experiencing intimate partner-related physical injury in the past 12 months, including individual, sociocultural, and access to care factors, as shown in Table 40. In the first predictive model, individual factors explained somewhere between 3.9% and 17.1% of the variability in experiencing physical injury in the past 12 months $X^2 (15, N= 319) = 12.594, p = .634$. In this model, experiencing physical injury in the past 12 months was not statistically associated with any of the individual predictors.

In the second model, sociocultural factors explained somewhere between 7.8% and 38.4% of the variability in experienced physical injury in past the 12 months $X^2 (8, N= 331) = 26.970, p = <.001$. In this model, experiencing physical injury in the past 12 months was statistically associated with social support ($p = .010$), beliefs toward sexuality ($p = .037$), and religiosity ($p = .040$). The odds of experiencing physical injury in the past 12 months were 48% higher with higher beliefs toward sexuality scores ($aOR: 1.477; 95\% CI: 1.024 - 2.128$). In contrast, the odds of experiencing physical injury in the past 12 months were 37% lower with higher social support scores ($aOR: .626; 95\% CI: .440 - .892$), and 35 % lower with higher religiosity scores ($aOR: .647; 95\% CI: .427 - .980$). Experiencing physical injury in the past 12 months was not statistically associated with the remaining predictors tested in this model.

In the third predictive model, access to healthcare predictors explained somewhere between 1.6% and 8.3% of the variability in experiencing physical Injury in the past 12 months $X^2 (6, N= 386) = 6.420, p = .378$. In this model, experiencing physical

injury in the past 12 months was not statistically associated with any of the access to healthcare predictors.

Table 40

Logistic regression analysis of predictors-experiencing physical injury in past 12 months

Predictors	Criterion Variables	Experiencing Physical Injury in Past 12 Months						
		B	SE	Wald	df	Sig.	Exp(B)	95% CI
Individual Predictors (N=319)								
Age (M=21)		-.108	.224	.232	1	.630	.898	.578-1.393
US born (Yes vs. No)		-.560	.802	.488	1	.485	.571	.119-2.749
Parents reside in NJ (Yes vs. No)		-.608	.819	.551	1	.458	.544	.109-2.710
Student attendance status: (Full time vs. Part time)		-.754	1.388	.295	1	.587	.470	.031-7.137
Student enrollment status (Under Graduate vs. Graduate)		.123	1.450	.007	1	.933	1.131	.066-19.400
Full time work status (Yes vs. No)		1.635	1.254	1.698	1	.192	5.127	.439-59.913
Single status (Yes vs. No)		.547	1.028	.283	1	.595	1.728	.230-12.960
Mother attended college: (Yes vs. No)		.104	.823	.016	1	.900	1.109	.221-5.565
Father attended college: (Yes vs. No)		-.231	1.214	.036	1	.849	.794	.073-8.579
Immigrated to US-education: (Yes vs. No)		1.827	1.123	2.647	1	.104	6.215	.688-56.141
Immigrated to US-socioeconomic: (Yes vs. No)		1.281	.888	2.080	1	.149	3.600	.632-20.523
Religion (Christian vs. Muslim)		1.149	1.107	1.076	1	.300	3.154	.360-27.619
Belongs to student organizations (Yes vs. No)		.658	.835	.622	1	.430	1.931	.376-9.911
Belongs to religious organizations (Yes vs. No)		-.018	.749	.001	1	.981	.982	.226-4.258
Daily interactions (mostly ME, Mostly non-ME, an equal mix of both)		-.449	.475	.894	1	.344	.638	.251-1.619
Constant		-4.215	4.844	.757	1	.384	.015	
Omnibus Tests of Model Coefficients	Chi-square=12.594; df=15; P=.634							
Model Summary	-2 Log likelihood=69.373; Cox & Snell R ² =3.9%; NagelkerkeR ² =17.1%							
Sociocultural Predictors (N=331)								
Acculturation - Heritage		.132	.080	2.733	1	.098	1.141	.976-1.334
Acculturation - Mainstream		.003	.079	.001	1	.972	1.003	.860-1.170
Perceived Stress		.083	.228	.133	1	.716	1.087	.695-1.699
Social Support		-.468	.181	6.709	1	.010	.626	.440-.892
Perceived Discrimination		-.013	.074	.030	1	.863	.987	.854-1.141
Attitude Towards Women		-.043	.078	.313	1	.576	.958	.822-1.115
Beliefs Toward Sexuality		.390	.187	4.363	1	.037	1.477	1.024-2.128

Religiosity	-.436	.212	4.214	1	.040	.647	.427-.980
Constant	-1.275	8.127	.025	1	.875	.279	
Omnibus Tests of Model Coefficients	Chi-square=26.970; df=8; P<.001						
Model Summary	-2 Log likelihood=48.398; Cox & Snell R ² =7.8%; Nagelkerke R ² =38.4%						
Access to Healthcare (N=386)							
Health Insurance (Yes vs. No)	17.890	7703.5 67	.000	1	.998	5883279 1.2	.000-
Have Healthcare Provider (HCP) (Yes vs. No)	-.009	.816	.000	1	.991	.991	.200-4.907
Have seen HCP in past 12 months (Yes vs. No)	.040	.903	.002	1	.965	1.041	.177-6.114
Obtain health information from Internet (Yes vs. No)	-.480	.875	.301	1	.584	.619	.111-3.441
Obtain health information from family/friends (Yes vs. No)	-1.607	.832	3.725	1	.054	.201	.039-1.025
Obtain health information from television (Yes vs. No)	-16.913	9240.9 00	.000	1	.999	.000	.000-
Constant	-20.250	7703.5 67	.000	1	.998	.000	
Omnibus Tests of Model Coefficients	Chi-square=6.420; df=6; P=.378						
Model Summary	-2 Log likelihood=79.023; Cox & Snell R ² =1.6%; Nagelkerke R ² =8.3%						

Note. ME=Middle Eastern

CHAPTER SIX

DISCUSSION

Health Behaviors Among Middle Eastern College Women in the United States

This descriptive correlational study examined the rates and correlates of health behaviors among Middle Eastern college women in the US. The study sample included 406 women of Middle Eastern of Arabic descent (first or second generation) who are currently enrolled in college or have recently graduated from college in the US. Given the lack of literature on the health and wellbeing of Middle Eastern populations in the US, the findings of this study provide great insight on the health behaviors and risk factors among Middle Eastern college women. Further, the findings address the factors that influence health behavior in this population, including individual, sociocultural, and access to healthcare factors. The health behaviors examined in this study include smoking, cervical cancer screening, age-appropriate immunizations, sexual behaviors, body weight, nutrition, physical activity, and experiences of unwanted sexual contact and injury.

Smoking

This study found the rates of cigarette smoking are 21% and 20% for Hookah smoking for this population. Al-Omari & Scheibmeir report, among a study sample of 96 Arab American adults, 11% were female cigarette smokers (Al-Omari & Scheibmeir, 2009). A second study by Arfken, et al looked at water pipe smoking (Hookah). This study reported among US Muslim college students, 61% were female water pipe smokers. Among those that smoke the water pipe, 36% are of Arabic descent, including males (Arfken, Abu-Ras, & Ahmed, 2014). A third study that looked at risky health

behaviors among US Muslim college students reported smoking among female college students for cigarettes was 35% and for water pipe smoking was 37% (Jamil et al., 2014). However, the study did not report ethnicity among the sample of Muslim students. Studies found in the literature regarding cigarette and Hookah smoking did not focus on the unique study sample of Middle Eastern college women in the US, which could explain the differences in the findings. Therefore, the results of this study are unique and not comparable to other studies found in the literature.

The results of the multivariate analysis in this study show that higher rates of cigarette smoking were found among Middle Eastern college women who have lower levels of heritage acculturation, have liberal beliefs about sexuality, and do not have a healthcare provider. Even though studies have not examined these predictive factors in this population, studies have documented the effect of these factors on smoking in other immigrant populations. The relationship between cultural heritage and risky health behaviors (i.e., smoking) in this study may be explained by the protective effect of heritage culture.

The results of the multivariate analysis in this study show that higher rates of Hookah smoking were found among Middle Eastern college women who are Muslim, belong to student organizations, interact daily with both Middle Eastern and non-Middle Eastern students, and have higher levels of acculturation heritage and religiosity. Studies found in the literature support the theory of the protective effect of the heritage culture. Studies, cited by Gonzalez et al., indicate those whom have highly assimilated to US culture, are more likely to take risks compared to their less acculturated counter parts (Gonzalez Castro et al., 2007).

Cervical Cancer Screening

This study found the rates of ever having a Pap test were 24% and ever having an HPV test was 16% among this study sample of 406 women of Middle Eastern background who are currently enrolled in college or have recently graduated from college in the US. Secondary data analysis of the 2000–2011 National Health Interview Survey compared cancer-screening behaviors of US-born and foreign-born (European and Arab countries) non-Hispanic White women. After adjusting for age, foreign-born Arab American women were significantly less likely (84%) to receive a Pap test in their lifetime than European (87%) and US (95%) women (Dallo & Kindratt, 2015). These findings are consistent with the findings of this study, 76% report not ever having a Pap test, concluded from the 24%, who report having had a Pap test.

Studies have found college women, who are more likely to have access and advantages, are also more likely to avoid preventative measures associated with cervical cancer screening (Chang, Nguyen, & Nguyen, 2011). Earlier studies focused on lack of knowledge in regards to healthy behaviors, as it relates to Pap test (Ackerson, Zielinski, & Patel, 2014). However, fear of pain, embarrassment, threat to virginity, and fear of a cancer/ HPV diagnosis may be factors in "avoidance behavior" (Ackerson, 2010; Mays, Zimet, & Winston, 2000). This could explain the low rate (24%) in this study of ever having a Pap test in the sample of Middle Eastern college women.

A study done by Albright and Allen, published in 2018, looked at HPV misconceptions among US college students, the role of health literacy. Among their findings, 50% of the participants incorrectly responded to the questions regarding the role of the HPV vaccine in preventing the development of cervical cancer, which

demonstrates a fundamental misunderstanding of the action of the vaccine (Albright & Allen, 2018). This could explain the low rate (16%) in this study of ever having an HPV test in the sample of Middle Eastern College women.

The results of the multivariate analysis in this study show that lower rates of cervical cancer screening / HPV tests were found among younger women, less than 21 years of age, those of Muslim religion, those whom report belonging to student organizations, those with lower levels of mainstream acculturation, and those whom report higher score on "Beliefs Toward Sexuality". Higher scores on this scale indicate conservative beliefs toward sexuality, which include guilt and shame. Accesses to a gynecologist or Women's Health Center were significant predictors to having had a Pap test.

These results may be explained by the Health Belief Model cited earlier in this study, whereby individual health behavior is influenced by one or more of the theoretical constructs of "perceived seriousness of an illness", "perceived susceptibility of an illness", "perceived benefits of the health behavior" and "perceived barriers of preventative measures". The lower rates of cervical cancer screening may be explained by the low perception of susceptibility of developing cervical cancer at a young age, less than 21 years of age. This coincides with research reported by Ackerson et al (2014), college students, participating in cervical cancer screenings are more likely to be older, ages 22-25, and more knowledgeable regarding the benefits of screening (Ackerson et al., 2014).

Arab Muslim women in the US, whom have lower levels of acculturation mainstream may adhere to traditional Islamic attire, e.g. Hijab, thus upholding traditional

beliefs of modesty and conservatism, which may be explained as a "perceived barrier" to cervical cancer screening. According to traditional Middle Eastern cultural beliefs, illness, disease, and death are pre-determined by the will of God. Thus, seen as counter intuitive to the "perceived benefits" of screenings and preventive medicine (Puchalski, Dorff, & Hendi, 2004).

The findings from this study (low rates of Pap test and HPV tests) are consistent with the initial impetus to conduct this research on factors that influence health behaviors among Middle Eastern college women. My observations of Middle Eastern college students in an undergraduate-nursing program, dressed in traditional Islamic attire, practicing nursing skills in a learning skills lab prompted questions. I recognized their discrete appearance as a commitment to their religious and cultural values, modesty and conservatism. But I also began to think about their health practices. Do they participate in cervical and breast cancer screenings? Do they seek Pap test, cervical exams, and breast exams that require exposing those most private body parts? How do they negotiate their religious and sociocultural values that may conflict with recommended health practices in the US?

The lower uptake of Pap and HPV tests in this study is consistent with Dallo and Kindratt (2015), whom report higher rates of cervical cancer screening among married women. Among traditional women of Middle Eastern descent, premarital virginity and bodily privacy reflect respect and reputation. Beliefs exist that virginity is defined by the presence of the intact hymen. A Pap test is believed by some to disturb the hymen and violate bodily privacy. Gynecological exams and cervical cancer screening are suggestive of sexual engagement, therefore, perceived as a tangible (Abboud, Sweet

Jemmott, & Sommers, 2015).

Lastly, this study reported, higher rates of cervical cancer screening were among those with access to a gynecologist or Women's Health Center. Consistent with this finding are those reported by Abboud et al (2017), having a provider increased the odds of receiving a Pap test.

Immunizations Appropriate for Age

This study found the rates of ever having a HPV vaccine were 37%, having the flu vaccine 66%, and ever having had the meningitis vaccine was 61% among this study sample of 406 women of Middle Eastern background who are currently enrolled in college or have recently graduated from college in the US. Ackerson et al cite, HPV vaccine, is a primary measure of preventing HPV, however, recent studies indicate many college students have not been vaccinated (Ackerson et al., 2014). Despite the expanded knowledge in HPV over the past decade, misconceptions regarding the vaccine persist. Misconceptions include low risk in contracting HPV and lack of belief that the vaccine will protect them against HPV and cervical cancer. While college students remain at risk for HPV, university health clinics report HPV vaccination uptake is as low as 10% among female students. While HPV vaccine is not a required vaccination for college attendance, a missed clinical opportunity exists to educate women when administering the required vaccines, i.e. meningitis and flu vaccines (Albright & Allen, 2018).

Research on vaccination behavior among Arab Americans lags behind our knowledge of vaccination behavior in other immigrant and minority groups. A study with data from a national health survey found that Arab Americans had lower estimated rates of recommended vaccinations (flu) when compared to non-Hispanic Whites (Abuelezam,

El-Sayed, & Galea, 2018). Dallo and Kindratt (2015) report no current literature exists that examines flu vaccine uptake, among Arab American women. Foreign born Arab American women were less likely to report having flu vaccine compared to US born white woman (Dallo & Kindratt, 2015).

A study on vaccination barriers and uptake among female students at a New York State University, reported students receiving the meningococcal meningitis vaccine were more than twice as likely to report having initiated the HPV vaccine series. Temporality, or the relationship between receiving the two vaccines extended over time, was not assessed. Uptake of meningococcal meningitis vaccine in this population was very high, most likely related to New York State Public Health Law, which requires incoming college students to receive information on meningococcal disease and to provide either proof of vaccination or a signed declination of the meningitis vaccine. The high uptake may also be related to the more imminent and severe risk of meningococcal meningitis among housed college students (Bednarczyk et al., 2015).

In summary, studies found in the literature regarding immunizations appropriate for age e.g. HPV, flu, and meningitis did not focus on the unique study sample of Middle Eastern college women in the US, which could explain the differences in the findings. In this study, rates of HPV vaccine lag behind flu and meningitis vaccines. Mandatory program or university requirements may account for the higher uptake of flu and meningitis vaccines. There is a missed clinical opportunity here for healthcare providers to educate and recommend HPV vaccination to students in tandem with flu and meningitis vaccines.

The results of the multivariate analysis in this study show that higher rates of receiving HPV vaccination are associated with daily interactions with both Middle Eastern and non-Middle Eastern students, mothers having attended college, those having health insurance, and having access to gynecologist/ Women's Health Center. Lower rates of HPV vaccine are associated with higher levels of heritage acculturation and higher scores on Beliefs toward Sexuality, these results are reflective of conservative beliefs toward sexuality, which include guilt and shame.

The literature discusses a probable barrier to vaccine uptake among Arab Americans is "cultural context". Previous studies have reported Arab Americans do not typically engage in preventative care i.e. vaccinations/screenings. These studies cited embarrassment, fatalism, stigmatization regarding sexual behaviors (HPV vaccine), and immigration status (Dallo & Kindratt, 2015; Kavar, 2012; Salman, 2012; K. Schwartz, Fakhouri, Bartoces, Monsur, & Younis, 2008). The results of these studies explain lower rates of vaccinations are associated with acculturation and attitudes towards women.

Sexual Behaviors

This study found the rates of having sexual intercourse was 61%, higher among those reported as married, using a condom last time had sexual intercourse was 57%, and the rate of contraception use last time during sexual encounter was 78%, among this study sample of 406 college women of Middle Eastern background in the US. This study focused on Middle Eastern women with Arabic descent, either first or second generation. Among this group of college women, demographic data included religious affiliation; whereby 64% reported being Muslim and 32% being Christian.

Studies reporting sexual behaviors in the US among college students have focused on Muslim college students, specifically those with Islamic beliefs. Despite discrete religious differences, Christian and Muslim Arabs share ethnic heritage influenced by Islamic values regarding the role of women and unmarried intimacy, including sexual intercourse, which is forbidden and considered a risky behavior (Ahmed, Abu-Ras, & Arfken, 2014; J.G. Read, 2003).

The study by Ahmed et al. looked at the prevalence of risk behaviors among US Muslim college students. The rate of sexual intercourse among unmarried college Muslim female students was 48%. Among sexually active, unmarried Muslim students, using a condom occasionally was 66%. A comparison of condom use by gender among never-married Muslims was not conducted due to small number of responses to this question (Ahmed et al., 2014). There were no studies to identify contraception methods in this population.

A qualitative study by Aboud et al (2019), examined sexual activity among Arab women in the US. The demographics of their study participants were similar to this study, e.g. Arab American female, median age 25 years old; self identified as Christian or Muslim and had at least undergraduate education (or were enrolled on an undergraduate university course). The researchers argued that in order to understand the meaning attached to lived choices of Arab women living in the US, it is imperative that their life stories are properly contextualized:

The fact that I was living abroad meant that I could probably get away with that if I wanted to, whereas in the past I wouldn't, because I was always with my parents and like I need a car everywhere. If I wanted to do that, I could, but like it just made it more relevant. Because the fact that it's a choice – yeah, it's a choice here. Like back home,

it's not even a choice. [...] Like I don't think about it. I think about it, obviously, but it is something that I would never do. I feel like living at university has made me more independent and has changed my perspective on virginity. I don't think losing your virginity is that big of a deal anymore. I feel like at 21, you know if it happens, like I don't think that's gonna change myself and my identity and lead to some sort of deterioration, because I've just established myself. Like I know myself really well, and I know what works and what doesn't, what I should and what I shouldn't (Abboud, Lanier, Sweet Jemmott, & Sommers, 2019).

Quantitative studies found in the literature regarding sexual behaviors among Middle Eastern college women in the US did not focus on the unique study sample of Middle Eastern college women in the US, which could explain the differences in the findings. The focus on this study population of Middle Eastern college women, may explain the reported rates of having had sexual intercourse as 61%, of which the rates were higher among those whom reported married. It is less likely to disclose or engage in sexual activity in those that report single status in the context of conservative cultural values.

The results of the multivariate analysis in this study show the common predictors of sexual behaviors are daily interaction with both Middle Eastern and Non Middle Eastern students and access to either health insurance/healthcare provider or gynecologist. The common predictors of lower odds of sexual behaviors are single status and Muslim religion.

Minority college students may encounter and navigate between multiple groups' behavioral expectations. Thus may be explain the influence of daily interactions with both Middle Eastern and Non-Middle Eastern Students, who represent a mix of both sexually liberal and conservative students (Ahmed et al., 2014).

Zlesky & Schiaffino (2000) also reported religiosity as a predictor in the increase of unprotected sexual activity among those who are sexually active. Thus, adherence to

religion may represent a risk factor for unsafe sex among sexually active adolescents, which implies risky sexual behavior (Zaleski & Schiaffino, 2000). Munro-Kramer et al (2016) reported, 70.2% of the Arab-American sample in their study did not report any type of sexual activity (i.e., oral, vaginal, or anal sex). However, among those who reported abstinence, 12.5% received clinical recommendations from their healthcare provider for pregnancy and/or sexually transmitted infections. This inconsistency between responses and clinical recommendations may highlight the significant influence of traditional Arab-American religious and family taboos on the discussion of sexual issues, which precipitates underreporting, in the context of single status and religiosity.

Nutrition|

This study found 43% of participants trying to lose weight, 41% trying to maintain weight, 42% eating less calories to avoid aging weight and 41% eating less fat to avoid weigh gain among study sample of 406 women. A study by Brittin and Obeidat (2011) examined food practices, changes, preferences and acculturation of Arab students in US universities. Similar eligibility criteria included, Arabic descent, currently living in the US, aged 18 years or older, and a university student. However, this study did not focus on female college students, nor did it disaggregate by gender. Most participants ($n = 28$) reported gaining weight in the US; 21 students gained 5–15 pounds. Factors influencing weight gain were the US lifestyle of eating more and sleeping well ($n = 19$), availability of food with high fat content ($n = 14$) and lack of time to exercise ($n = 3$) (Brittin & Obeidat, 2011). The results of the multivariate analysis in this study shows the common predictor of nutrition/body weight related to decrease in intake of sugary drinks, increased odds in losing weight and increased odds in maintaining body weight is higher

A study by Nasrallah et al, looked at body weight among female Arab university students. However, the study was conducted in Qatar. The study explored young Arab female attitudes, and behaviors towards healthy eating, body image, and weight loss. 58% of the participants responded to the weight loss attempt question, "attempting to lose weight". Body weight can be associated with psychological factors that create anxiety and stress to lose or maintain in young women. Statistically the results of attempting to lose weight reported in this study is similar to the 43% reported in US college women, despite University settings in the US and abroad (Nasrallah, Kimmel, & Khaled, 2019).

A descriptive study conducted by Jadallah et al (2015) reported overall results of better nutrition scores correlated with higher acculturation heritage scores among Arab Americans. The study sample was not exclusive to college women in the US (Jadalla, Hattar, & Schubert, 2015). Brittin and Obeidat reported in a study that looked at students, male and female, born in an Arab country, enrolled in US universities. The results indicated a decrease in number of meals consumed per day with a preference to American foods over Arabic. Among food consumed most frequently were soft drinks. Most participants gained weight (Brittin & Obeidat, 2011).

In a qualitative study by Alakaam et al (2015) that looked at factors that influence dietary habits of international students in the US, acculturation was a predictor. Students reported a higher consumption of fried food, sugar, salt, and prepared foods, snacks and soda beverages, associated with American diets (Alakaam, Castellanos, Bodzio, & Harrison, 2015).

Physical Activity

This study found the rates of partaking in physical activity/exercise was 37%,

partaking in physical activity/exercise to lose weight was 20%, partaking in physical activity/exercise to lose weight was 15%, and eating less fat to avoid weigh gain 41%, and partaking in physical activity/exercise for recreation was 18%, among the study sample of 406 women of Middle Eastern background who are currently enrolled in college or have recently graduated from college in the US.

A study conducted by Khalaf et al examined female university students, physical activity level, and associated factors. Students reported physical activity/exercise to lose weight was 28%, partaking in physical activity/exercise for recreation was 31%. Similar results were obtained in regards to reported physical activity/exercise to lose weight. However, in Khalaf's study, those partaking in physical activity/exercise for recreation were almost 50% higher (Khalaf, Ekblom, Berggren, Westergren, & Al-Hazzaa, 2013). Although this study examined female Middle Eastern university students, it was not conducted in the US.

A study conducted by Qahoush et al (2010) examined a sample of Arabic women, 18 years of age and older, living in the US. Among those who report partaking in physical activity/exercise, 15% reported partaking to lose weight. (Qahoush, Stotts, Alawneh, & Froelicher, 2010). Although this study examined a similar population living in the US, they were not college students. No one study found in the literature focused on the unique study sample of Middle Eastern college women in the US, which could explain the differences in the findings. Therefore, the results are not comparable to other studies found in the literature.

The results of the multivariate analysis in this study show the common predictors of partaking in physical activity, partaking in physical activity to lose weight, to not gain weight, and for recreation is access to care, having a healthcare provider.

Kahan (2011) explored factors that facilitated physical activity in Middle Eastern college students, attending a US college. Social networks/social support were the driving forces behind physical activity (Kahan, 2011). In a study by Leung et al (2016) looked at physical activity as a health behavior in college students. Study results reported, knowledge regarding the benefits of physical activity and physical activity as a mechanism to relieve stress (Leung et al., 2016).

Experiencing Unwanted Sexual Contact and Injury

This study found the rates of ever having been threatened with physical violence was 11%, ever experienced physical violence was 10%, ever experienced unwanted sexual contact was 17%, experienced physical violence in past year was 5%, and experienced physical injuries in past year was 2% among study sample of 406 women of Middle Eastern background who are currently enrolled in college or have recently graduated from college in the US.

In a study conducted by Amar and Gennaro (2005) that looked at dating violence among college women, reported 48% of college women report intimate partner violence and 33% experience physical violence (Amar & Gennaro, 2005). A pilot study done by Barkho et al (2011) looked at intimate partner violence among Middle Eastern women in Metro Detroit. The aim of the study was self-reported exposure. More than 70% of the participants disclosed being grabbed or shoved (physical violence) and 46% were threatened with physical violence (Barkho et al., 2010). Kulwicki et al (2015) cited

agreement in their study with those done by Barkho et al that reported high prevalence of intimate partner violence (Kulwicki, Ballout, Kilgore, Hammad, & Dervartanian, 2015).

Rates reported in the literature were significantly higher than the rates reported in this study. Studies found in the literature did not include the unique study sample of Middle Eastern college women in the US, which could explain the differences in the findings. Low reported rates of experiencing unwanted sexual contact and injury might be explained by conservative views, which manifests as shame and guilt. Shame and guilt related to sexual activity are emotions that are elicited out of unworthiness and associated with self-deprecating internal victimization of violence and abuse (Murray, Ciarrocchi, & Murray-Swank, 2007).

The results of the multivariate analysis in this study showed the common predictors of experiencing unwanted sexual contact and injury is Attitude Towards Women score and Social Support. Higher scores in the Attitudes Toward Women Scale indicate pro-feminist, liberal egalitarian attitude as opposed to a traditional conservative attitude, often inherent in the Middle Eastern culture. This may be explained by the influence of the US along with a mechanism of social support to empower woman to offset the power gender imbalance. Experiences of unwanted physical contact and injury are generally understood to include physical, sexual, and psychological abuse within close relationships. Gender-based power imbalances are believed to be a force behind violence (Conroy, 2013).

Forms of partner violence are a reflection of the conservative environment, seen as a health behavior through the conservative lens of the Middle Eastern culture. Whereby, women should tolerate, should obey, should abide by their husbands desires, otherwise

chastising and punishment is imminent, leading to experiences of unwanted sexual contact and injury.

Contrary to the findings of this study were the results reported in a study conducted by Abu-Ras (2007), which examined the predictors of partner violence among Arab American Women. The Attitude Towards Women Scale was incorporated to measure traditional versus liberal feminist attitudes and beliefs regarding of women's behavior. The mean score indicated the majority of the respondents held traditional attitudes toward female responsibility. Consequently, low levels of utilization of formal services, a formal means of social support was reported (Abu-Ras, 2007). Barkho et al (2010) reported findings similar to Abu-Ras, whereby, one-third of the Arab American women believed that men had certain rights to control their female partners. 93% of the respondents had experienced partner violence. Nearly half of the survey sample was unaware of their legal rights concerning partner violence (Barkho et al., 2010).

Studies have looked at these predictors in other populations. Lin et al (2016) found gender-role attitudes were significant predictors of college students' views on partner violence. Students who displayed more favorable attitudes toward male dominance were more tolerant of this behavior, and those who considered partner violence a criminal offense were less tolerant of such violence (Lin, Sun, Wu, & Liu, 2016).

In summary, some of the individual predictors influenced the health behaviors e.g. smoking, cervical cancer screening, age appropriate immunizations, sexual behaviors, nutrition, physical activity, and experiences of unwanted sexual contact and injury among this sample population. Among the individual predictors that influenced the health

behaviors are: religion (Muslim), age (< 21 years), student status (full-time), belonging to student organizations, daily interactions with Middle Eastern and non-Middle Eastern students, parental education, and having immigrated to the US for socioeconomic reasons. The strength of the individual predictors will be discussed in the section below.

The sociocultural predictors had influence on the health behaviors e.g. smoking, cervical cancer screening, age appropriate immunizations, sexual behaviors, nutrition, physical activity, and experiences unwanted sexual contact and injury. Among the sociocultural predictors that influenced the health behaviors are; social support, perceived discrimination, religiosity, acculturation, sexual beliefs, and patriarchal beliefs (attitudes toward women). The strength of the sociocultural predictors will be discussed in the section below.

Access to care predictors influenced the health behaviors e.g. smoking, cervical cancer screening, age appropriate immunizations, sexual behaviors, nutrition, physical activity, and experiences of unwanted sexual contact and injury. Among the access to care predictors that influenced the health behaviors are; having health insurance, having a health care provider/ gynecologist, or access to a women's health center, and source of health information (internet and television). The strength of the access to care predictors will be discussed in the section below.

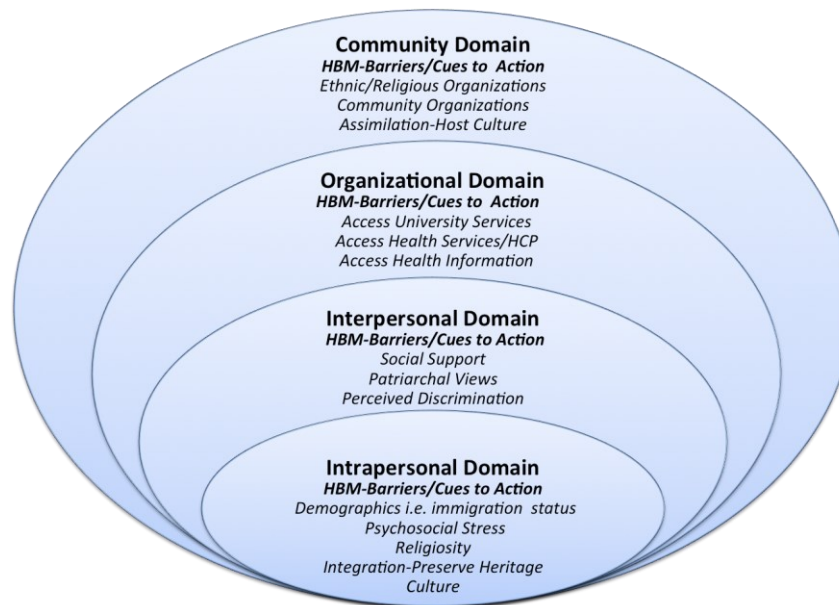
Integrating the Study Outcomes into the Conceptual Framework

The *Integrative Conceptual Framework* a multilevel approach guided the study to identify factors that influence health behaviors. This integrative model incorporates the multi-level domains regarding individual, interpersonal, organizational, and community, (as shown in Figure 6). Located within each domain are the associated predictors. The

predictors, seen as "barriers and/or cues" to action are the study demographics, sociocultural factors, and access to care.

Figure 6

Integrative Theoretical Model



The predictors of the health behaviors are linked to the respective domain in the following way: The *Intrapersonal Domain* addresses individual factors of this study, including demographic variables (e.g. immigration status and religious affiliation) psychosocial factors (e.g. stress, religiosity, and the individual's preservation of the heritage culture) while participating in the mainstream culture. The individual predictors within the Intrapersonal Domain that impacted the study outcomes are age, religion, marital status, belonging to student organizations, daily interactions with Middle Eastern and non-Middle eastern students, born in the US, student attendance status, parent's education, and immigration to US for socioeconomic reasons. The sociocultural

predictors within the Intrapersonal Domain that impacted the study outcomes are perceived stress, religiosity, heritage culture, beliefs toward sexuality, and patriarchal views (attitudes toward women).

The *Interpersonal Domain* addresses social support, patriarchal views, and perceived discrimination, which influence health behaviors as barriers or cues to action. The sociocultural predictors within the Interpersonal Domain that impacted the study outcomes are social support, attitudes toward women, and perceived discrimination. The *Organizational Domain* addresses access to university services (e.g. food, healthcare services, provisions for exercise and physical activity), health care provider, access to health information, as well as having health insurance that may influence health behaviors as barriers or cues to action. Availability and access to health services matters. Without access, age-appropriate immunizations or cervical cancer screening will not occur. The access to care predictors within the Organizational Domain that impacted the study outcomes are having a healthcare provider, gynecologist, or access to a women's health center, access to internet/television for health information, and having health insurance.

The *Community Domain* addresses affiliation with ethnic/religious organizations and affiliation with community organization that may influence health behaviors as barriers or cues to action. The influence of ethnic/religious organizations may oppose or restrict assimilation into the host culture. However, the influence of community organizations may facilitate assimilation into the host culture and positively influence health behaviors. The demographic predictors within the Organizational Domain that impacted the study outcomes are belonging to student organizations and mainstream

acculturation.

The R^2 values in the model summary in the regression tables represent the strength of the association of the predictor categories with the individual health behavior, as shown in Table 41. On average, the sociocultural predictors contributed to 18% of the variability compared to averages of 8.6% and 9% variability predicted by each of the other predictor categories. In other words, in this study, the sociocultural predictors have the strongest influence in the health behaviors in this population. The average variability predicted of 18% for the sociocultural predictor is double that of the individual and access to care predictor categories.

Table 41

The strength of the predictors

Health Behavior	Predictors Individual/ Demographics	Predictors Sociocultural	Predictors Access to Care
Cigarette Smoking Model Summary (R^2)	7.5%	11.4%	4.0%
Hookah Smoking Model Summary (R^2)	17.6%	10.8%	3.7%
Ever had a Pap Test Model Summary (R^2)	54.7%	15.0%	28.8%
Had Pap Test past year Model Summary (R^2)	33.5%	41.7%	26.6%
Ever had HPV Test Model Summary (R^2)	42.4%	25.7%	28.0%
Had HPV Vaccine Model Summary (R^2)	17.0%	20.2%	7.1%
Had Meningitis Vaccine Model Summary (R^2)	19.6%	16.2%	14.0%
Had Flu Vaccine Model Summary (R^2)	20.0%	14.9%	17.9%
Ever had sexual intercourse Model Summary (R^2)	39.1%	36.4%	5.6%
Condom Use Model Summary (R^2)	18.7%	13.0%	6.6%
Use Contraception Model Summary (R^2)	22.4%	27.1%	17.5%

High intake sugary drinks Model Summary (R^2)	26.1%	22.0%	13.9%
Trying to lose weight (Nutrition) Model Summary (R^2)	4.5%	6.5%	1.7%
Trying to maintain weight (Nutrition) Model Summary (R^2)	7.7%	6.8%	4.8%
Partake in Physical Activity Model Summary (R^2)	15.7%	16.3%	12.4%
Exercise to lose weight Model Summary (R^2)	9.8%	13.2%	8.1%
Exercise to avoid weight gain Model Summary (R^2)	15.4%	9.9%	5.0%
Exercise for Recreation Model Summary (R^2)	9.6%	11.7%	6.7%
Experience attempts physical violence Model Summary (R^2)	11.8%	19.0%	5.7%
Experience unwanted sexual contact Model Summary (R^2)	7.8%	15.4%	1.9%
Experiencing unwanted sexual contact past year Model Summary (R^2)	8.4%	16.6%	3.8%
Experiencing physical injury past year Model Summary (R^2)	17.1%	38.4%	8.3%
Average (R^2)	8.6%	18%	9%

Sociocultural Factors that Influence Health Behaviors in Middle Eastern College Women in the United States

Acculturation. Acculturation had a double-edged influence on health behaviors in this study. Maintaining acculturation heritage is contrary to contemporary beliefs that immigrants should adjust, integrate, and assimilate. Acculturation in this study is treated as a continuum that represents the tendency to maintain cultural heritage as well as the tendency to assimilate in the mainstream culture. Typically, in Middle Eastern cultures, the heritage culture is viewed as restrictive and protective, which discourages risky health behaviors. In contrast, mainstream American culture is viewed as permissive and an

advocate for individualism. Permissiveness and individualism may segue to risky health behaviors (e.g., smoking, intimate relationships outside of marriage, and substance use). When heritage culture is strongly present in the household of immigrant families, there is opportunity to influence values typical of the heritage (S. M. Schwartz et al., 2010).

Maintaining higher levels of heritage culture has positive effects on health behaviors, including lower rates of cigarette smoking and lower rates of ever experiencing unwanted sexual contact. However, maintaining higher levels of heritage culture also has negative effects on health behaviors, including higher rates of hookah smoking and lower rates of having Pap and HPV tests. In contrast, maintaining higher levels of mainstream culture has positive effects on health behaviors, including higher levels of having Pap and HPV tests, HPV vaccination, and exercising to avoid gaining weight. However, maintaining higher levels of mainstream culture increases the risk of having high intake of sugary drinks. Regarding Hookah smoking, the protective effect of heritage culture contributed to an increase in Hookah smoking and decreased participation in physical activity. These risky health behaviors open up opportunities for us to reach out to this population with interventions to mitigate and to address these problem areas through community outreach.

It is plausible to imply those maintaining cultural heritage are attending events at their own cultural centers, groups, and social media outlets. These locations may present opportunities for interventions with easy access to this population. The literature supports, adopting a "settings-based approach" to health promotion. This approach recognizes the impact of interventions customized to a specific cultural targeted population. Optimal settings in cultural centers, groups, and social media outlets are

supported by the presence of trusted and respected leaders, who serve to protect the values and integrity of the cultural beliefs (King et al., 2017). From a sociocultural perspective, cultural organizations can positively influence members' behaviors. Within the context of culture recruitment and participation can have a sustainable effect on interventions (Campbell et al., 2007).

Religiosity. Religiosity, as defined earlier in this study, is the extent one practices and adhere to the laws and customs of their religion (Haj-Yahia, 1998). Religiosity was evident in the data collected from self-reporting, Muslim religious affiliation, ascribing to the conservative views of Islam and in data retrieved from the Religiosity Scale. Religiosity in this study had a positive effect on two health outcomes, in which higher religiosity levels are associated with lower rates of Hookah smoking and with lower reports of experiencing physical injury in the past 12 months related to intimate partner violence.

The protective effect of religion and religiosity may mediate participation in risky health behaviors in young adults (Ahmed et al., 2014). Religion is known to provide a moral compass, which in turn influences behavior and structures actions that is reflected in the belief systems of the religious community (Gryczynski & Ward, 2010). In a study of Iranian University students, participants whom adhered to religion and religious observances were less likely to engage in hookah smoking. Religiosity in this study was defined as, private religious activities, such as prayer, meditation or study of the Quran. Concluding participation in private religious activities positively influenced self-esteem, a sense of self-efficacy, and personal conservatism (Nabipour, Alizadeh, Saadat-Hosseini, Shamsoddini, & Nakhaee, 2016).

Adherence to religious principles is also associated with less risky sexual behavior. Religious influence shapes behavior. A study of Polish University students found that stronger religious commitment, was associated with a decrease in risky sexual behavior, therefore, the protective effect is evident in the decrease in vulnerability toward sexual victimization (Tomaszewska & Krahe, 2016).

Similar to the effect of heritage culture, those maintaining higher levels of religiosity are attending events at their own religious centers and social media outlets. These locations may present opportunities for interventions with easy access to this population. The literature supports, adopting a "settings-based approach" to health promotion. This approach recognizes the impact of interventions customized to a specific religious targeted population. Optimal settings for targeted interventions include mosques, churches, religious community centers, and social media outlets that are predominantly used by Middle Eastern communities and are supported by the presence of trusted and respected leaders, who serve to protect the values and integrity of the religious beliefs (Campbell et al., 2007; King et al., 2017). From a sociocultural perspective, religious organizations and social media outlets can positively influence members' behaviors. Within the context of religion these settings can have a sustainable effect on interventions.

Beliefs Towards Sexuality. The results of this study show double-edged effects for beliefs towards sexuality on health behavior outcomes. Having more conservative views toward sex is protective against cigarette smoking and against ever having sexual intercourse. However, conservative views toward sex are also associated with lower rates of having an HPV test and higher rates of experiencing physical injury in the past 12

months related to unwanted sexual contact. Physical injury is the most severe type of partner violence.

Numerous studies by Haj-Yahia et al (2003,2012, 2015) report conservative views toward women and non-egalitarian role expectations, which are significant predictors of partner violence. The patriarchal structure in Arab society, reflected in the gender inequality of men and women, is the societal norm (Haj-Yahi, 2003; Haj-Yahia, Wilson, & Naqvi, 2012; Haj-Yahia & Zaatut, 2015). The male-female hierarchy gives rise to the dominant male and submissive female, thus enabling and justifying attempts of unwanted sexual contact and or physical injury.

Attitudes Toward Women. The results of this study show several effects for beliefs towards women on health behavior outcomes. Having more liberal/egalitarian attitudes toward women is protective against ever having sexual intercourse, experiencing attempts of physical violence, and ever experiencing unwanted sexual contact. These findings may be explained by the prevailing culture in the US and western Europe, whereby, less gender ideologies and male dominance and more egalitarian views towards women, serve to position women on equal footing with their male counterparts. However, in the Middle East, predominately patriarchal and male-dominated societies prevail, the power imbalance between men and women is legitimized by the social structure (Haj-Yahi, 2003).

Access to Care Factors that Influence Health Behaviors in Middle Eastern College Women in the United States

The results of this study show that access to health care services influences health behaviors among Middle Eastern college women in different ways. **First**, having a health

care provider contributes to lower rates of cigarette smoking as well as higher rates of meningitis vaccinations, partaking in physical activity, and exercising to lose weight, to avoid gaining weight, and/or for recreation. **Second**, having a gynecologist or access to a women's health center contributes to higher rates of having a Pap test in lifetime and in the past year, having both HPV testing and vaccination, and contraception use. **Third**, seeing the healthcare provider in the past 12 months contributes higher rates of receiving meningitis and flu vaccination, higher rates of condom use, and lower rates of ever experiencing attempts of physical violence. **Lastly**, the source of health information influences health behaviors in this population. Obtaining health information from the Internet contributes to higher rates of HPV testing, meningitis vaccination, partaking in physical activity, and exercising to lose weight. In addition, obtaining health information from the television contributes to partaking in physical activity.

Access to care predictors (having health insurance, having a healthcare provider/gynecologist, and access to health information) influences our efforts to intervene. Clinicians, Health Care Providers, and Student Health Centers need to know where we see the gaps in health behaviors and interventions, and where there are missed clinical opportunities to improve vaccination, testing, encouraging healthy behaviors, and combating risky behaviors. In a study conducted by Kepka et al, whereby, they defined a missed clinical opportunity as one in which the patient received at least one adolescent vaccination, but not an HPV vaccine. They reported, missed opportunities for HPV vaccination among pre-teens (age 11–12) and young adult women (age 19–26) (Kepka et al., 2016). Although, generally speaking, college-age women are older than the typical target age of vaccinating females for HPV, beginning at age 11, it is important

to note that there is a delay in sexual activity in this population of Middle Eastern women.

Another example is the higher rates of contraception and condom use in those reporting having seen HCP/gynecologist in the past year and among those whom seek health information from the Internet. This is an opportunity to disseminate health information pertaining to cervical cancer screening electronically and to promote cervical cancer screening opportunities through student health centers.

In summary, based upon the data reported in this study, accesses to care factors are significant predictors of smoking, nutrition, physical activity, vaccinations, cervical cancer screening, and contraception. More importantly are the points of care for this population. Establishing care points, to include women health services, within college and university settings and within the community. Increasing provider awareness in all settings regarding where we see the gaps in health behaviors and interventions, and areas where we have seen missed clinical opportunities in vaccination, cervical cancer screening, contraception, and signs of physical injury, experienced by this population.

Important to note and disseminate to care providers, university, and community settings, is the preferred source of receiving health information. The preferred methods of accessing health information for this sample population are the Internet and television. Accessing the Internet for health information has contributed toward higher rates of HPV testing, meningitis vaccination, and partaking in exercise, vaccinations, cervical cancer screening, and contraception. The Internet is an opportunity for seeking information privately, anonymously, and without self-disclosure.

Study Limitations

There are a few limitations to consider when interpreting the results of this study. *First*, given the cross-sectional design of the study, the directionality of relationships cannot be established, which limits the ability to conclude causality. However, the purpose of this exploratory study was to simply examine associations between the study outcomes and the predictors. *Second*, this study was conducted in Northeastern US and recruitment was primarily through Rutgers University, which is a state university. This could limit generalizability of the study findings to populations with similar characteristics to the study sample. As such, the study findings may not be generalizable to Middle Eastern college women in other parts of the country (e.g., Southern or Midwest regions) and who are enrolled private universities or community colleges in the US. *Third*, the participants' responses in this study may be susceptible to recall bias and social desirability bias, particularly related to risky health behaviors. Furthermore, restriction of immigration policies and travel bans implemented by the current US Administration may have contributed to raising fears and distrust in this population, thus affecting recruitment, as well as data collected from this study. It is however not clear how much of an effect recall and social desirability had, if any, on the study findings. Social desirability bias in was minimized in this study by using an anonymous online survey for data collection, allowing participants to complete the survey at conveniently private times/locations and eliminating the need to meet face-to-face with the researcher. Future studies should explore the impact of the political atmosphere on the health behaviors of Middle Eastern populations in the US.

Lastly, instruments used for this study were not developed or tested for Middle

Eastern populations in the US. Thus, if any of the study instruments did not accurately capture the study variables, it could have contributed to not being able to find statistically significant results, particularly for the effects of perceived discrimination and perceived stress. This limitation was minimized in this study by pilot-testing the survey items with a small group of Middle Eastern college women and using their feedback to ensure culturally relevant language and cultural appropriateness.

Implications for Policy, Practice, and Future Research

Despite the limitations, the findings highlight many opportunities to improve the health of Middle Eastern college women in the US, an under-represented population in research and targeted health interventions. The driving points from this study will inform the expansion of university health service's policies and primary care to address health services specific to this population. This study provides policy implications for program intervention needed for this population through allocation of resources for risky health behaviors. Policy will influence practice. Within college and university settings, the targets are Student Life Services, which include, recreational centers, food services, student health centers, student organizations, e.g. cultural and religious organizations. Practice is not limited to college and university settings. Program interventions should extend to the community and adjacent neighborhoods. Community settings include community health centers, women's health centers, private practices, and cultural and religious organizations.

Strategies to promote services should begin with educating providers within and around the college or university settings of the unique cultural needs of this population, to include interventions to educate women with conservative views. As a result of cultural

induced submissive behavior, it places this population at a higher risk for violence and physical injury. Providing support and education to these women regarding the negative effects of violence and sexual abuse is an important intervention. Targeting the more conservative women within this population is an opportunity to provide education regarding cervical cancer screening, HPV vaccines and contraception. Due to the delay in sexual behaviors in this population, the opportunity may exist to effectively vaccinate against HPV. It has also been noted in the literature that there have been missed clinical opportunities to educate and administer HPV vaccines, when administering flu and often university required meningitis vaccines (Kepka et al., 2016).

Interventions targeting the low uptake in cervical cancer screening in this population may be enhanced through the availability of gynecologists, advanced practice nurses specialized in women's health, and women's health centers. Counseling and education should target perceived internal and external barriers to screening, benefits to screening, and the ability to provide the screening and support to this population.

Opportunities for practice exist within this targeted population to educate on the effects of Hookah smoking. The tradition of Hookah smoking remains popular among Arab Americans at social and cultural events both on and off campus. Misconceptions exist regarding the safety of the inhaled substances, i.e. tobacco and nicotine and the risk of infectious diseases, due to the sharing of the mouthpiece. Hookah smoking traditionally sanctioned in the homes and gatherings of Middle Eastern families may not been perceived as harmful and an opportunity to maintain heritage culture (Nabipour et al., 2016).

Addressing nutrition and physical activity can occur through campus food

services and recreational facilities. Implementing policies that address campus food service providers in regards to religious and cultural preferences, and decrease in the offerings of sugary drinks will address the challenges of losing weight and maintaining a healthy weight.

This exploratory research study looked at factors that influence health behaviors among Middle Eastern college women in the US. Throughout the course of the research and in-depth literature reviews there was little or no studies found that addressed this unique population of Middle Eastern college women in the US regarding smoking, cervical cancer screening, immunizations for age, sexual behaviors, intake of sugary drinks, physical activity, and experiences of unwanted sexual contact, and injury related to partner violence. Furthermore, these health behaviors have not been explored in the context of the individual predictors (i.e. country of birth, reasons for immigration to the US, economic status, or daily interactions with Middle Eastern or non- Middle Eastern students), sociocultural predictors (i.e. social support, perceived discrimination, beliefs toward sexuality) and/or access to care factors (i.e. access to gynecologist or women's health centers). The lack of prior literature addressing these factors in this unique population provides opportunities for future research.

Implications for future research are implied to explore the impact of religiosity on health behaviors among Arab Muslims versus Christian Arabs. There is evidence from this research to examine the interactive effect between religion and religiosity on health behaviors.

Qualitative research based upon the findings from this study would strengthen the data to further understand the mechanism of influence the predictors have on the health

behaviors that could help us fine-tune interventions. Furthermore, exploring the diversity within this target population regarding religious affiliations and cultural norms will contribute to the depth of understanding health behaviors within this population. Lastly, adapting/testing stronger instruments will provide a mechanism to strengthen the measurements in this population.

The benefits derived from the study findings have provided us with implications to policy, practice, and future research. The study design, integrative theoretical model, and findings contribute to the current literature, which is lacking in data related to factors that influence health behaviors among Middle Eastern college women in the US.

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Appendix 1

Power and Sample Size Calculation

The study outcomes are health behaviors, which include smoking, cervical cancer screening, age- appropriate immunizations, sexual behaviors, nutrition, and physical activity (Centers for Disease Control and Prevention, 2001, 2011, 2012, 2013, 2014). The study outcomes are categorical variables. The study predictors are demographic characteristics, socio-cultural factors (psychosocial and cultural factors), and access to healthcare services. *Demographic factors* include age, country of birth, immigration generation status, country of family origin, student status, health insurance, marital status, parent's level of education and employment, reason for immigration to the US, religion, and affiliation with religious/community organization (13 variables). The *psychosocial factors* include history of dating/sexual violence, social support, psychosocial stress, and perceived discrimination (4 variables). The *cultural factors* include religiosity, acculturation, and patriarchal beliefs (3 variables). *Access to healthcare services* will include having a healthcare provider, access and utilization of health services, and access to health information (3 variables). In total, there are 23 predictors.

Principles of Power Analysis

The power analysis conducted was to calculate a sample size that would yield 80% power (i.e., $\beta = 0.20$) to detect a difference and 5% (i.e., $\alpha = 0.05$) cutoff for statistical significance. The following are factors that affect sample size:

1. Effect size: a smaller sample is needed to detect a large effect size with adequate power (i.e., large differences and correlations can be detected in smaller samples). Also, a large sample is needed to detect small effect size with adequate power to detect a

difference. In order to detect a small effect, it has a negative effect on sample size (i.e., small differences and correlations require larger samples). (Small effect size requires a large sample)

2. Variation of data: study variables with smaller variability (small SD) can be detected with small samples; whereas, study variables with larger variability (large SD) can be detected with large samples.

3. Type I error: Type I is controlled at the level at which alpha is set. Selecting a more stringent alpha level (e.g., 0.01) requires a larger sample than setting the more widely acceptable alpha level (0.05).

4. Power (1-Type II error): Type II error is controlled by the level at which beta is set. Selecting lower beta level (e.g., Beta=0.10; power=0.90 or 90%) requires a larger sample than setting the more widely acceptable beta level (beta=0.20; power=0.80 or 80%).

Sample Size Calculation

Literature is very limited regarding health behaviors within the population of interest in this study, Middle Eastern college women in the US. We used three approaches to estimate the sample size necessary to generate at least 80% power to detect a difference at an α level of 0.05. The first approach is based on relevant existing studies. The second approach is based on anticipating a medium effect size. The third approach is based on model building for the multivariate analysis.

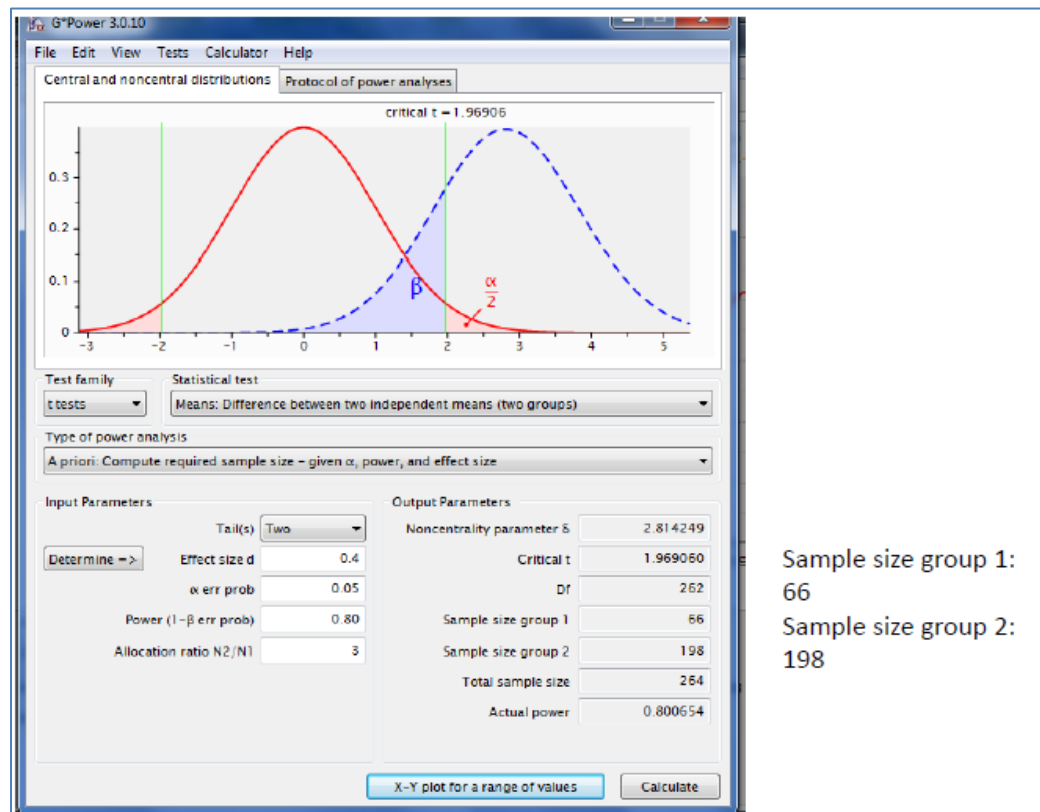
Approach 1

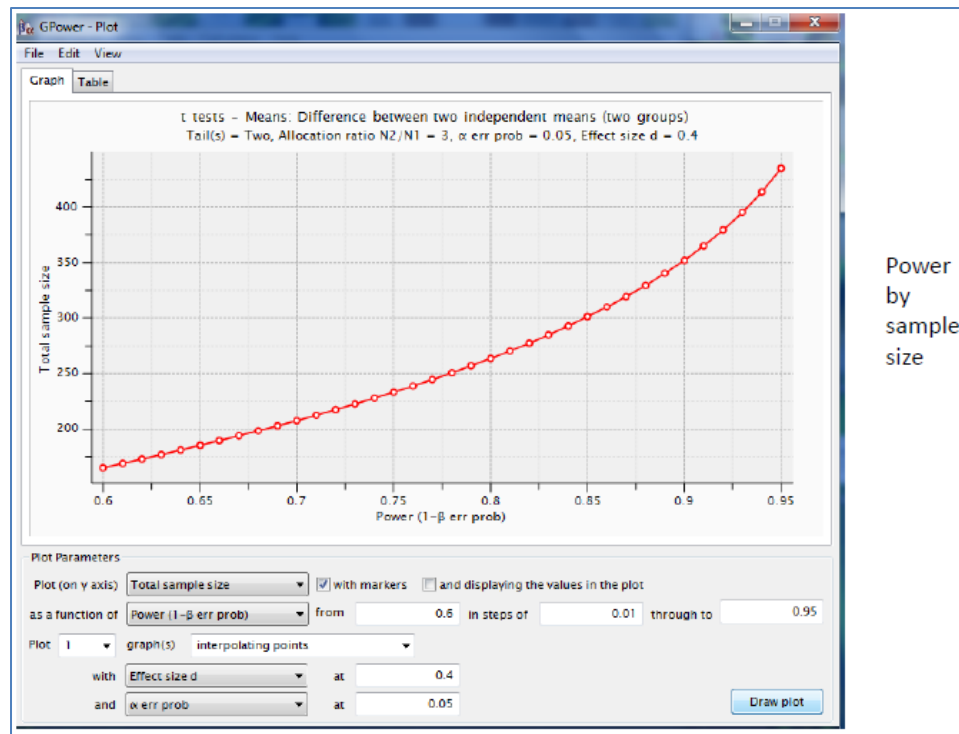
The sample size calculation in this study is based on one study that examined cervical cancer screening among Arab women (Bener et al., 2001). Bener and colleagues reported a 15.4% rate for cervical cancer screening among Arab women with a

relative risk (RR) of 1.81 for employed vs. unemployed women and a RR of 2.43 by women living in suburban vs. urban areas. Based on their reported rate (15.4%) and RR for employment (1.81), a sample of 286 yields an 80% power to detect a difference at an α level of 0.05. Further, based on their reported rate (15.4%) and RR for urbanicity (2.43), a much smaller sample size (119) yields an 80% power to detect a difference at an α level of 0.05.

Approach 2

The study outcomes (health behaviors) are binary outcomes, which are yes/no variables. Assuming a 3:1 ratio of outcomes (i.e., 25% yes, 75% no; or vice versa) and a medium effect size of 0.4, a sample size of 260 would yield an 80% power to detect a difference at an α level of 0.05, as shown in the figures below.





Power
by
sample
size

Approach 3

Courvoisier (2010) examined the relation between correctness of estimation and several data characteristics: number of events per variable (EPV), number of predictors, percentage of predictors that are highly correlated, percentage of predictors that were non-null, size of regression coefficients, and size of correlations. The conclusion was that there is no single rule based on EPV that would guarantee an accurate estimation of logistic regression parameters. Instead, the number of predictors, probable size of the regression coefficients based on previous literature, and correlations among the predictors must be taken into account as guidelines to determine the necessary sample size.

Courvoisier (2010) also indicates in the discussion:

“The second noteworthy result is that the power of the regression models was often very low, even for 20 or 25 EPV when the OR is below 2 [11]. For comparative studies, the computation of sample size to achieve the desired power is well codified. In contrast, no such standard procedure exists for model building and multivariate analyses. A

commonly used rule of thumb is that the number of EPV should be greater than 5 or 10. This rule of thumb will lead to insufficient power, so that variables that actually predict the outcome will be found non-significant in the initial model and, in the case of model building, dropped from the prognostic model. Thus, data structure should always be taken into account to obtain an estimate of necessary sample size. Taken together, the results of this study imply that researchers should explore the correlations of their predictors of interest and should be careful about including several highly correlated predictors into a logistic regression model. Possible solutions to this problem include the selection of uncorrelated predictors based on clinical criteria or the computation of a single score representing all correlated predictors (e.g., through factor analysis).”

From the above, we need at least 20 individuals per predictor. In the event the outcome is 50%-50%, the old rule indicates a sample size of 10 per predictor, if all predictors are independent of each other. This indicates a sample size between 200 and 400.

Another approach is to use the online calculator, G-Power (<http://www.gpower.hhu.de/>). We used the following formula: $N = 10 \text{ times } k/p$ (where N = sample size; k – number of predictors; p – proportion of success [the 1 outcome]). The calculation for the proposed study is $N=10*(20)/(0.5)=400$.

Therefore, a sample of 400 for the proposed study provides adequate power to test the associations between the study outcomes and predictors. This also provides larger than needed power to build a regression model by eliminating non-contributing predictors. At this time, we do not have estimates of the correlations between predictors, or whether the predictors will have high collinearity, which would lead to removal of one or more predictors by either forward or backward elimination techniques. The removal of non-contributing predictors will lead to a more parsimonious model with better prediction.

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Appendix 2

Study Variables, Measurement Instruments, and Survey Questions

Variable	Instrument	Items	Measurement
Dependent Variables / Outcomes			
Smoking	1. Do you now smoke cigarettes every day, some days, or not at all? 2. During the past 12 months, have you stopped smoking for one day or longer because you were trying to quit smoking (2014 BRFSS Q9.2 and 9.3) 3. Do you smoke hookah every day, some days or not at all?	3	Categorical
Cervical Cancer Screening	1. Pap test is a test for cancer of the cervix. Have you ever had a Pap test? 2. How long has it been since you had your last Pap test? (2014 BRFSS Q15.5 and 15.6) 3. An HPV test is sometimes given with the Pap test for cervical cancer screening. Have you ever had an HPV test? 4. How long has it been since you had your last HPV test? (2014 BRFSS (Module 10: Q1-2)	4	Categorical
Age-appropriate immunizations	1. A vaccine to prevent the human papillomavirus or HPV infection is available and is called the cervical cancer or genital warts vaccine, HPV shot, Have you EVER had an HPV vaccination? 2. How many HPV shots did you receive? (2014 BRFSS Module 11: Q1-2) 3. During the past 12 months, have you had either a flu shot or a flu vaccine that was sprayed in your nose? (2014 BRFSS Q11.2) 4. Have you ever had a meningitis vaccine?	4	Categorical
Sexual behaviors	1. Have you ever had sexual intercourse? 2. How old were you when you had sexual intercourse for the first time? 3. During your life, with how many people have you had sexual intercourse? 4. During the past 3 months, with how many people did you have sexual intercourse? 5. The last time you had sexual intercourse, did you or your partner use a condom?	6	Categorical

Nutrition	<p>6. The last time you had sexual intercourse, what one method did you or your partner use to prevent pregnancy? (2011 YRBSS Q 58-61, 63,64)</p> <p>1. During the past 30 days, how often did you drink sugar-sweetened drinks, sweet tea/ coffee and sports or energy drinks (such as Gatorade and Red Bull)? Do not include 100% fruit juice, diet drinks, or artificially sweetened drinks. (2013 BRFSS Module 5: Q2)</p> <p>2. The next question is about eating out at fast food and chain restaurants. When calorie information is available in the restaurant, how often does this information help you decide what to order? (2012 BRFSS Module 5: Q3)</p>	6	Categorical
Physical Activity	<p>3. Are you now trying to lose weight? 4. Are you now trying to maintain your current weight that is to keep from gaining weight? 5. Are you eating either fewer calories or less fat to... lose weight? 6. Are you using physical activity or exercise to... lose weight? (2001 BRFSS Module 11: Q1-4)</p> <p>1. What type of physical activity or exercise did you spend the most time doing during the past month? 2. How many times per week or per month did you take part in this activity during the past month? 3. And when you took part in this activity, for how many minutes or hours did you usually keep at it? 4. During the past month, how many times per week or per month did you do physical activities or exercises to STRENGTHEN your muscles? Count activities using your own body weight like yoga, sit-ups or push-ups and those using weight machines, free weights, or elastic bands.</p>	4	Categorical
Dating/Sexual Violence	<p>(2013 BRFSS Q12.2, 12.3, 12.4, 12.8)</p> <p>1. Has an intimate partner or someone you dated EVER THREATENED you with physical violence? 2. Has an intimate partner or someone you dated EVER ATTEMPTED physical violence against you? 3. Have you EVER experienced any unwanted</p>	5	Categorical

sex by a current or former intimate partner or someone you dated?

4. In the past 12 months, have you experienced any physical violence or had unwanted sex with an intimate partner or someone you dated?

5. In the past 12 months, have you had any physical injuries, such as bruises, cuts, scrapes, as a result of this physical violence?

Independent Variables / Predictors

<i>Demographic Characteristics</i>	<ul style="list-style-type: none"> Age, country of birth, citizen status, immigration generation status, country of family origin, student status, type of health insurance, marital status, parents level of education, parent's employment, reason for family immigration to the US, religion, affiliation with religious / community organization 	13	Categorical
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Sociocultural Factors Psychosocial

(2007 BRFSS Module 18: Q1, 2, 4, 5, 6)			
• Social support	• Enriched Social Support Instrument (ESSI) (Vaglio et al., 2004)	7	Continuous
• Psychosocial stress	• Perceived Stress Scale (Cohen et al., 1983)	4	Continuous
• Perceived discrimination	• Everyday Discrimination Scale-Short Version (Kim et al., 2014)	5	Continuous

Sociocultural Factors Cultural

• Religiosity	• Religiosity Scale (Haj-Yahia, 2002)	3	Continuous
• Acculturation	• Vancouver Index of Acculturation (Ryder et al., 2000)	20	Continuous
• Patriarchal beliefs	• Attitudes Toward Women Scale (Spence & Helmreich, 1978)	15	Continuous
• Beliefs toward Sexuality	• Attitudes Toward Premarital Sexuality Askun & Ataca, 2007) Perceived Parental Attitudes about Sexuality Scale (Sprecher, 1989)	8	Continuous

Access and Utilization of Health Services

1. Do you have a personal doctor or a Primary Healthcare Provider?	6	Categorical
2. Was there a time in the past 12		

months when you needed to see a doctor but were unable?

3. About how long has it been since you last visited a doctor for a routine checkup?

(2014 BRFSS Q3.2, 3.3, 3.4)

4. Do you have a gynecologist or have access to a Women's Health Clinic?

5. Was there a time in the past 12 months when you needed to see a gynecologist or Women's Health Services but were unable? 6. How do you access health information?

Appendix 3

Formatted Study Survey

Factors that Influence Health Behaviors among Middle Eastern College Women in the United States

Eligibility questions

Are you female?	Yes	No
Are you 18 years or older?	Yes	No
Are you currently enrolled in college or have recently graduated from college (within the past 6 months)?	Yes	No
Do you consider yourself of Middle Eastern/Arab background?	Yes	No
Are you 1 st or 2 nd generation immigrant (or on a student visa)? <i>Hint: You are 1st or 2nd generation immigrant if you <u>or</u> one/both of your parents were born outside of the United States.</i>	Yes	No

[STUDY CONSENT WILL BE PLACED HERE]

The following questions are demographic:

Age: _____

Country of birth:

United States Outside the US

Country of family origin:

Bahrain Egypt Iraq Jordan Kuwait
 Lebanon Oman Palestine Qatar Saudi Arabia
 Syria United Emirates Yemen Other: _____

Immigration generation status:

1st generation 2nd generation On a student or visitor visa

US citizen status:

Born in US Naturalized Student Visa Temporary Visa

Number of years in US: _____

Current Place of Residence:

On-Campus Off-campus housing With parents With other relatives

Parents' residence:

New Jersey Other parts of the US Abroad

Student status:

Full time Part time
 Undergraduate Graduate

Paid work status:

Full time Part time not working

During **AN AVERAGE SCHOOL WEEK**, select from the following table the combination that best describes the ratio of the time you spend in class compared to the time you spend in paid work per week.

Hints:	No work	Work 1 day a week	Work 2 days a week	Work 3 days a week	Work 4 days a week	Work 5 days a week	Work 6 days a week	Work 7 days a week
% of your time in class per week	100%	80%	70%	60%	50%	40%	30%	20%
% of your time in paid work per week	0%	20%	30%	40%	50%	60%	70%	80%

What (%) of your TUITION comes from: *(make sure the total adds up to 100%)*

Your own earned money: _____%

Scholarship: _____%

Parental support: _____%

What (%) of your money for PERSONAL EXPENSES comes from: *(make sure the total adds up to 100%)*

Your own earned money: _____%

Parental support: _____%

Health insurance: Private Through University None

Marital status: Single Married Dating/Engaged Other

Mother's education: High school or less College Graduate/Professional degree

Father's education: High school or less College Graduate/Professional degree

Mother's occupation: _____

Father's occupation: _____

Reason immigration to US for you or your parents:

Education Socio economic Political freedom Other: _____

Religion:

Christian Muslim Other: _____

Do you belong to... (Select all that apply)

Student Organizations Community Organizations Religious Organizations

Other: _____

Who do you mostly interact with on a daily basis?

Mostly Middle Eastern students Mostly non-Middle Eastern students Equal mix of both

This section asks about your Health Behaviors

Smoking:

1. Do you now smoke cigarettes? Every day Some days Not at all

If you answered YES, continue to the next question.

If you answered NO, skip to question 3.

2. During the past 12 months, have you stopped smoking for one day or longer because you were trying to quit smoking? Yes No

3. Do you now smoke hookah? Every day Some days Not at all

Cervical cancer/HPV screening:**4. Have you ever had a Pap test?**

Yes

No

Pap test is a test for cancer of the cervix.*If you answered YES, continue to the next question.**If you answered NO, skip to question 6.***5. How long has it been since you had your last Pap test?**Within the
past yearWithin the
past 2 years3 years ago
or more**6. Have you ever had an HPV test?**

Yes

No

Not sure

An HPV test is sometimes given with the Pap test for cervical cancer screening.*If you answered YES, continue to the next question.**If you answered NO, skip to question 8.***7. How long has it been since you had your last HPV test?**Within the
past yearWithin the
past 2 years3 years ago
or more**Age-appropriate immunizations:****8. Have you EVER had an HPV vaccine?**

Yes

No

This is a vaccine that prevents cervical cancer, other cancers, and genital warts.*If you answered YES, continue to the next question.***9. How many HPV shots did you receive?**

1 or 2

All 3 shots

10. During the past 12 months, have you had either a flu shot or a flu vaccine?

Yes

No

11. Have you ever had a meningitis vaccine?

Yes

No

Sexual behaviors:**12. Have you ever had sexual intercourse?**

Yes

No

*If you answered YES, continue to the next question.**If you answered NO, skip to the next section.***13. How old were you when you had sexual intercourse for the first time?****14. During your life, how many people have you had sexual intercourse with?****15. During the past 3 months, how many people did you have sexual intercourse with?****16. Did you or your partner use a condom the last time you had sexual intercourse?**

Yes

No

17. What one method did you or your partner use to prevent pregnancy, the last time you had sexual intercourse?

None

Birth control pills

Condoms

Implant

Other

Nutrition:**18. During the past 30 days, how often did you drink sugar-sweetened drinks, sweet tea/ coffee and sports or energy drinks (such as Gatorade and Red Bull)? Insert number.**Times
per dayTimes
per week**19. When calorie information is available in the restaurant, how often does this information help you decide what to order?**

Always

Most of
the timeSome-
times

Never

20. Are you now trying to lose weight?

Yes

No

21. Are you now trying to maintain your

Yes

No

current weight?

22. To avoid gaining weight are you eating either fewer calories or less fat? Yes Yes No
less calories less fat

Physical Activity:

23. Do you partake in physical activity or exercise? **Yes** **No**

If you answered YES, continue to the next questions.

If you answered NO, skip to the next section

24. Do you partake in physical activity to lose weight, keep from gaining weight, or recreational? (Select all that apply) Lose weight Not gain Recreational

25. What type of physical activity or exercise did you spend the most time doing during the past month? (Type in your answer)

26. How many times per week did you take part in this activity during the past month? (Type in your answer)

27. During the past month, how many times per week did you partake in physical activities or exercises to STRENGTHEN your muscles? (Insert number). Never
Times Times
per per
Week Month

For example: yoga, sit-ups or push-ups, using weight machines, free weights, or elastic bands.

This section asks you about dating/sexual violence:

28. Has an intimate partner or someone you dated EVER threatened you with physical violence? Yes No

Hint: Intimate partner includes: spouse, fiancé, boyfriend or girlfriend

29. Has an intimate partner or someone you dated EVER attempted physical violence against you? Yes No

30. Have you EVER experienced any unwanted sexual contact by a current or former intimate partner or someone you dated? Yes No

Hint: Sexual contact includes sexual intercourse, unwanted touching, etc.

31. IN THE PAST 12 MONTHS, have you experienced any physical violence or had unwanted sexual contact with an intimate partner or someone you dated? Yes No

32. IN THE PAST 12 MONTHS, have you had any physical injuries, such as bruises, cuts, scrapes, black eyes, vaginal or anal tears, or broken bones, as a result of this physical violence or unwanted sex? Yes No

This section will ask you about access to and use of healthcare services:

Access and Utilization of Health Services

33. Do you have a primary healthcare provider (e.g. a doctor or nurse practitioner)? Yes No

34. About how long has it been since you last visited a doctor for a routine checkup? Within the past year Within the past 2 years 5 or more years

35. Was there a time in the past 12 months when you needed to see a doctor but were unable? Yes No
why? _____

36. Do you have a gynecologist or have access to a Women's Health Clinic? Yes No

37. Was there a time in the past 12 months when you needed to see a gynecologist or Women's Health Services but were unable? Yes No
why? _____

38. How do you access health information? Social media
Select all that apply. Internet

Family
 Friends
 TV
 Posted flyers
 Magazines
 Other: _____

This section asks questions related to acculturation with the American culture and retention of your Middle Eastern culture:

Acculturation	Strongly Disagree	Disagree	Agree	Strongly Agree
1 I often participate in my <i>Middle Eastern</i> cultural traditions.				
2 I often participate in mainstream <i>American</i> cultural traditions (e.g. celebrate July 4th, Memorial Day, and Thanksgiving)				
3 I would be willing to marry a person from my <i>Middle Eastern</i> culture.				
4 I would be willing to marry a <i>non-Middle Eastern American</i> .				
5 I enjoy social activities with people from the same <i>Middle Eastern culture</i> as myself.				
6 I enjoy social activities with <i>non-Middle Eastern</i> individuals.				
7 I am comfortable interacting with people of the same <i>Middle Eastern</i> culture as myself				
8 I am comfortable interacting with <i>non-Middle Eastern</i> individuals.				
9 I enjoy entertainment (e.g. movies, music) from my <i>Middle Eastern</i> culture.				
10 I enjoy <i>mainstream American</i> entertainment (e.g. movies, music).				
11 I often behave in ways that are typical of my <i>Middle Eastern</i> culture.				
12 I often behave in ways that are typically <i>mainstream American</i> .				
13 It is important for me to maintain or develop the practices of my <i>Middle Eastern</i> culture.				
14 It is important for me to maintain or develop <i>American</i> cultural practices.				
15 I enjoy the jokes and humor of my <i>Middle Eastern</i> culture.				
16 I enjoy <i>non-Middle Eastern</i> jokes and humor.				
17 I am interested in having friends from my <i>Middle Eastern</i> culture.				
18 I am interested in having <i>non-Middle Eastern American</i> friends.				

This section asks about your feelings and thoughts during the last month: Indicate how often you felt or thought a certain way.

- | | | Never | Rarely | Some
times | Often |
|---|--|-------|--------|---------------|-------|
| 1 | In the last year, how often have you felt that you were unable to control the important things in your life? | | | | |
| 2 | In the last year, how often have you felt confident about your ability to handle your personal problems? | | | | |
| 3 | In the last year, how often have you felt that things were going your way? | | | | |
| 4 | In the last year, how often have you felt overwhelmed by difficulties in your life? | | | | |

This section asks about people in your environment who provide you with help or social support.

- | | | Never | Rarely | Some
times | Often |
|---|--|-------|--------|---------------|-------|
| 1 | Is there someone available to whom you can count on to listen to you or offer emotional support? | | | | |
| 2 | Is there someone available to you to give you good advice about a problem? | | | | |
| 3 | Is there someone available to you who shows you love and affection? | | | | |
| 4 | Is there someone available to help you with daily chores? | | | | |
| 5 | How often do you feel that you have adequate emotional support? | | | | |

This section asks about experiences of discrimination in the United States.

- | | | Never | Rarely | Some
times | Often |
|----|---|-------|--------|---------------|-------|
| 1 | Have Americans ever kept their physical distance from you because of your appearance or cultural background? | | | | |
| 2. | Have you heard the media (newspaper, television, internet, or radio) make derogatory remarks, speak untruths or describe Middle Eastern lives as having no value or less value than other American lives? | | | | |
| 3. | Have you ever observed Middle Eastern individuals being stared at in a hostile or threatening manner? | | | | |
| 4. | Did you ever feel like you had to express anti-Middle Eastern sentiments in front of others, even if you did not feel that way? | | | | |
| 5. | Do you often defend your religious beliefs or your cultural background to others? | | | | |
| 6. | Where you ever in a situation where you felt isolated because you were the only one, or one of the few Middle Eastern individuals in a group of non-Middle Easterner individuals? | | | | |
| 7. | Have others treated you like you were an outsider or a | | | | |

- foreigner?
8. Have you ever been singled out by airport personnel, bank tellers, security, or others based upon your name or your appearance?
 9. Were you ever concerned that someone might question your loyalty to the United States?
 10. Have you ever felt that you were treated unfairly because of your religion or ethnicity?
 11. If you wear Islamic dress (hijab/niqab/jilbab) do you feel you have to be cautious when out in public alone? N/A

The section asks about your attitudes toward the roles of women in society which different people have. There are no right or wrong answers, only opinions.

		Strongly Agree	Agree	Disagree	Strongly Disagree
1	Swearing and obscenities are more repulsive in the speech of a woman than a man.				
2	When women are employed outside of the home, men should share in household tasks such as washing dishes and doing laundry.				
3	It is insulting to women to have them "obey" their husbands.				
4	A woman should be as free as a man to propose marriage.				
5	Women should worry less about their rights and more about becoming good wives and mothers.				
6	Women should be entitled to equal opportunities in the workplace as men.				
7	Women should be given equal opportunities as men for leadership positions.				
8	A woman should not expect to go exactly the same places or to have quite the same freedom of action as a man				
9	It is ridiculous for a woman to be a welder and for a man to sew.				
10	The intellectual leadership of a community should be largely in the hands of men.				
11	Women earning as much as their dates should equally bear the expense when they go out together.				
12	Sons in a family should be given more encouragement to go to college than daughters.				
13	In general, the father should have greater authority than the mother in the bringing up of the children.				
14	Economic and social freedom is worth far more to women than the acceptance of the ideal of femininity, which has been set up by men.				
15	There are many jobs in which men should be given preference over women in being hired or				

promoted.

Strongly Agree Agree Disagree Strongly Disagree

This section asks you questions about YOUR BELIEFS about sexual relations outside of marriage. There are no right or wrong answers, only opinions.

- | | | Strongly Agree | Agree | Disagree | Strongly Disagree |
|---|--|----------------|-------|----------|-------------------|
| 1 | I believe sexual intimacy is acceptable for me on a first date. | | | | |
| 2 | I believe sexual intimacy is acceptable for me when I am casually dating my partner. | | | | |
| 3 | I believe sexual intimacy is acceptable for me when I am engaged to my partner. | | | | |
| 4 | A woman who is sexually active is less likely to be considered a desirable partner. | | | | |
| 5 | My parents would be accepting of me having an intimate relationship without being married. | | | | |
| 6 | My parent's attitudes about sexual behaviors outside of marriage matter to me. | | | | |
| 7 | I would feel guilty about engaging in sexual intimacy without being married. | | | | |
| 8 | Engaging in sexual intimacy without being married would cause me shame. | | | | |

This section asks about how religion affects your life and decisions.

- | | | Always | Sometimes | Rarely | Never |
|---|---|--------|-----------|--------|-------|
| 1 | To what extent do you consider yourself religious? | | | | |
| 2 | To what extent do you practice and adhere to the laws and customs of your religion? | | | | |
| 3 | To what extent do you identify and feel affiliated with our religion? | | | | |
| 4 | To what extent does religion affect your life and important decisions? | | | | |