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Impact of Internet Usage on Risk Perceptions of Hookah Use

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Impact of Internet Usage on Risk Perceptions of Hookah Use

By

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ABSTRACT

Introduction: Hookah use has been increasing in recent years. This is possibly due to the fact that hookah is often believed to be a safer alternative for tobacco consumption. This misperception is often amplified by marketing and advertising by tobacco companies on the internet. Since advertising on the internet is not regulated, there needs to be an understanding of the relationship between how a person uses the internet and the perceptions that they hold about hookah smoking.

Aim: To determine if a relationship exist between internet usage and possible misperceptions of hookah smoking.

Methods: Secondary data from a cross-sectional survey on hookah use was analyzed for this study. This survey assessed many aspects of hookah use like initiation, risk perceptions, smoking behaviors but it also assessed the participant's internet behaviors. This study focused on the internet behaviors, risk perceptions of hookah use, and socio-demographic variables. Participants (age 18-31 years) were sampled from two public universities in Georgia. Pearson correlations, chi-squared test and frequencies were conducted to establish whether there was a relationship between internet usage and risk perceptions.

Results: Overall, participants (n=1049) believed that cigarettes delivered more toxins, were more addictive, and more likely to be associated with cancer. A large majority of participants did not believe that only hookah was associated with addictiveness, chemical toxins, and diseases. The most utilized ways the participants used the internet were for email, homework/research/work, listening to music, and contacting friends. Participants hardly used the internet for meeting new people, creating or maintaining webpages, playing games, and for spiritual/religious topics. The following internet behaviors were most likely to be associated with an increase in the acknowledgment of the risk of smoking hookah: email, shopping, news, music/theater/art, and health/medicine information. The chi squared test showed that there was a relationship between internet use and risk perception. There was also a relationship for internet use and gender and race. However, there were no relationships found between risk perception and gender or race.

Discussion: A relationship was found between risk perceptions for hookah and certain ways that the internet is used by young adults. More focused research is needed in order to fully understand these relationships. These findings can help influence tobacco interventions and tobacco policies related to the internet.

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CHAPTER 1
INTRODUCTION

Tobacco control and prevention has been one of the greatest public health achievements with the cigarette use decreasing every year according the Center of Disease Control. However, there has been a recent increase in alternate tobacco products. Hookah is one of these alternative products whose use has been steadily increasing in recent years. Hookah is perceived as a safer way to consume tobacco but it is actually just as harmful as cigarettes, if not more so. This misperception is perpetuated by tobacco companies who often use the internet to promote these hookah products.

The internet is becoming a way for companies to promote tobacco products without the restrictions of tobacco regulation policies. This means that young adults could be exposed to numerous portrayals of hookah use via the internet. Since young adults are most susceptible to initiation of tobacco use after seeing positive images of tobacco use, it is important to understand the relationship between how a person uses the internet and their perceptions of risk. If we understand this relationship, then it could be possible to implement strategies to correct misperceptions of hookah use through the internet. For example, if a person uses the internet mainly for social purposes and that person believes that hookah smoking is healthier than cigarettes, then we could use social websites to help educate that person on the dangers of hookah smoking.

The purpose of this study is to establish if there is a connection between internet usage and risk perceptions of hookah use. We hypothesize that is a person who uses the internet for research, news, or information is more likely to acknowledge the risk that comes along with hookah smoking. Therefore, if a person uses the internet for leisurely activities than they are more likely to believe that hookah smoking is a safe way to consume tobacco.

Chapter 2

REVIEW OF LITERATURE

Cigarette Usage Rates among US Young Adults

In the United States, 42.1 million (18.1%) of all adults smoke cigarettes with smoking being more common among men than women (Smoking and Tobacco Use Fact Sheet, 2014). 17.3% of 18-24 year olds are current smokers according to the Center for Disease Control (2014). The overall prevalence is declining from 20.9% in 2005 to 18.1% in 2012 (Smoking and Tobacco Use Fact Sheet, 2014). However, the youth and young adults' populations still have high tobacco use rates. The Center for Disease Control found that in a day more than 3,200 people under 18 smoke their first cigarette and that 2,100 youths and young adults become daily smokers (2014). Young adults are so more likely to use multiple tobacco products which puts them at a higher risk (Smoking and Tobacco Use Fact Sheet, 2014).

Tobacco use is by far the most preventable cause of death in the United State. Tobacco kills around 450,000 people in the United State and estimated to kill 5 million people worldwide every year (American Lung Association, 2007). It is predicted that 16 million people suffer from diseases associated with smoking like heart disease, cancer, stroke, lung disease, and diabetes (Smoking and Tobacco Use Fact Sheet, 2014). If the current rates of smoking continue, 5.6 million of American youths under age 18 are projected to die prematurely from a smoking related illness (Smoking and Tobacco Use Fact Sheet, 2014).

Emerging Hookah Trend in the United States

In recent years, a new tobacco trend of smoking hookah (also known as waterpipes, narghile, shisha, hubble-bubble) has become popular the United States. Hookah use originated in the Middle East and spread to the United States with a spike in use in recent years (American

Lung Association, 2007). A waterpipe consist of a bowl, a base, a pipe and a hose with a mouthpiece. The base is filled with water and is connected to the bowl where the tobacco (shisha) is heated by charcoal. The tobacco is filtered through the water and into the hose. The most popular form of tobacco is a wet mixture of tobacco, flavorings and sweetener (Cobb et. al, 2010).

Prevalence of Hookah Tobacco Use among Young Adults

Recent data has shown that there has been a substantial increase in hookah use by adolescents and young adults (Maziah et. al, 2004). According to the Center for Disease Control, prevalence of hookah use could range between 22% and 40% of young adults. In 2010, about 1 in 5 boys (17%) and 1 in 6 girls (15%) had used a hookah in the past year (Smoking and Tobacco Use Fact Sheet, 2014).Hookah use has become increasingly popular on college campuses with most hookah cafes being located around college campuses (Cobb et. al, 2010). One study found that 15% of college students at a large southern Michigan university (n=602) have tried hookah, which exceeded the amount of students using stimulant drugs (Grekin & Ayna, 2008). Another study found that among University of Pittsburg students (n=647) lifetime prevalence of hookah use was comparable to lifetime prevalence of cigarette use (Primack et. al., 2008). A longitudinal study of first year female college students at a private upstate New York school (n=483) found that lifetime hookah use increased from 29% to 34% during the first year of college (Fielder et. al., 2012).

Factors Associated with Hookah Use among Young Adults

Other factors are also associated with hookah use. Logistic regression models that have analyzed data from a sample of Chicago high school students (n=951) have found that age, sex, race, alcohol and marijuana use, attendance at hookah bars, and current use of cigarettes,

smokeless tobacco, cigar, and kretek are all predictors of ever use of hookah (Sterling & Mermelstein, 2011). Peer acceptability and perceived popularity were strong predictors of hookah use among University of Pittsburg students (n=647) (Primack et. al, 2008). One study found that hookah use is increasing the most among younger, affluent individuals (Ward et. al, 2007). Ward et. al. found that among American military recruits (n=20,673), hookah users were more likely have a higher education, use cigarettes and consume alcohol when compared to non-users (2006). Hookah users are also twice as likely to smoke cigarettes compared to non-users (The Bacchus Network). Dual use of tobacco products is also an important factor in hookah studies. Rath et. al found that among a sample taken from the Legacy Young Adult Cohort Study (n=4,201) 8% of people reporting everyday cigarette use also smoked hookah in the past 30 days (2012). However, hookah was not usually the first method of smoking tobacco by the participants (Rath et. al, 2012). This means that many hookah smokers are likely to also use other tobacco products, which might increase health risks.

Smith-Simone et. al. suggest that the psychosocial risk profiles of hookah smokers are significantly different from non-users (2008). This is based on a cross-sectional internet survey done at John Hopkins University in which a logistic regression revealed that risk profiles differed by type of smoker, tobacco products smoked. This study also found that freshman found hookah most appealing products to use among peers (Smith-Simone et. al., 2008) This means that there may be different social factors that influence whether a person smokes hookah or not. A cross-sectional study found that majority of hookah users in that sample only smoke with friends and smoke in hookah bars (Barnett et. al, 2013). This social aspect could explain why hookah use has increase so rapidly in recent years. If this trend continues, hookah use may begin to surpass the use of cigarettes (Wasim, 2008).

Flavored shisha is a major appeal for youths to start smoking hookah (The Bacchus Network). Another appeal of hookah use is the low cost of hookahs, which can be as low as $14 and the tobacco mix which usually cost around $7 (The Bacchus Network).

Perceptions of Risk about Hookah Tobacco Smoking

In the United States, there is a belief that hookah is a safer way to consume tobacco compared to cigarettes (Maziah et. al, 2004). Misperceptions about the harms of hookah use seem to be common among users regardless of their demographics (Aljarrah et. al. 2009). One study found that past-30 day hookah users were "much less likely than never-users to believe that waterpipe is as harmful as cigarettes" (Eissenberg et. al, 2008). There are repercussions of the misperceptions regarding the safety of hookah use. For example, pregnant woman might be more likely to use hookah instead of cigarettes because they believe that is it not harmful (Wasim, 2008).

Health Effects of Hookah Tobacco Smoking

According to the American Lung Association, smoking hookah has been linked with several cancers and heart disease (2007). A systematic review showed that hookah smoking has been associated with lung cancer, respiratory illness, low birth weight, and periodontal disease but not significantly associated with bladder cancer, nasopharyngeal cancer, oesophageal cancer, oral dysplasia, and infertility (Akl et. al, 2010). Other health indicators for newborns are also a risk when the mother smokes while pregnant (Wasim, 2008 & Noonan et. al, 2009). Hookah smoking has also been associated with developing nicotine dependence. Users often report withdrawal symptoms when they stop using hookah although these withdrawal symptoms are not specified (Cobb et. al, 2010). There is also a chance for the spread of infectious diseases like tuberculosis and herpes because the mouth pieces are often passed around and shared (The

Bacchus Network). Hookah bar owners are not required to sterilize mouthpieces, which can increase the spread of disease in these establishments (The Bacchus Network). There is also risk for secondhand smoke exposure which could be seen as a violation of the clean indoor air policies (The Bacchus Network).

While there is a belief that passing smoke through water reduces exposure to toxicants there has been little evidence to support this belief (The Bacchus Network). In fact, the heat sources used for hookah actually increase health risks because they produce carbon monoxide, metals and carcinogens (The Bacchus Network). A single session of hookah smoking, which usually last about an hour can be the equivalent of smoking 100 cigarettes (The Bacchus Network). The toxicant exposure of hookah smoke is comparable to cigarette use (Cobb et. al, 2010). The smoke can contain large amounts of nicotine, carbon monoxide, and tar. Nicotine absorption rates can be equal to smoking 10 cigarettes a day (Cobb et. al, 2010).

Hookah Smoking and Intention to Quit

According to a study of college students, 96% of participants believed that they could quit smoking hookah but very few had the intention to quit smoking (Smith-Simone et. al., 2008). Similar results regarding the intention to quit were found in another study as well (Ward et. al, 2005). Noonan et. al. found a correlation between smoking intention and beliefs (2011). This study found that as favorable attitudes, perceived subjective norms, and behavioral beliefs increased so did the intention to smoke. Another cross-sectional study reinforced these findings that social approval was an important determinant for hookah use (Noonan & Kulbok, 2012). However, attitudes towards hookah can change over time. According to Asfar et. al. the patterns and attitudes related to hookah smoking evolves to accommodate the life circumstances of the smoker (2005).

Regulating Hookah Tobacco Smoking

The U.S Food and Drug Administration oversee tobacco control in the United States. The Family Smoking and Tobacco Control Act became a law in 2009. This law allows the FDA to regulate the manufacture, distribution, and marketing of tobacco products. This law resulted in many policy changes for cigarettes and smokeless tobacco products. For example, to purchase tobacco products there must be a face-to-face sale and proof of age with 18 years being the minimum age a person can purchase tobacco. This law also limits the advertising of products, sponsorship of events by tobacco companies, and ban free samples of tobacco products. Changes to warning labels were a huge part of this law. Warning labels must not be misleading and must take up so much space on the product package according to these policy changes (Overview of the Family Smoking Prevention and Tobacco Control Act).

However, shisha is not regulated by the U.S Food and Drug Administration which means that the tobacco can be advertised as having no tar or nicotine which increases the beliefs that hookah smoking is actually a healthier choice than cigarette smoking (The Bacchus Network). Although warning labels can be found on a majority of hookah products, they are often misleading, erroneous and not visible (Nakkash & Khaili, 2010). While this does not violate any FDA guidelines for tobacco control, this could seriously affect perceptions about these products. WHO recommends that hookah products should be subjected to the same regulations as cigarettes and other tobacco products (World Health Organization, 2005).

Tobacco Use and the Internet

The internet has become an unescapable part our society. Almost every person has access to the internet in some way whether it is smart phones, laptops, or public computers. A report

found that in 2013 only 15% of American did not use the internet at all (Zickuhr, 2013). The internet has become a way for mass marketing and campaigns because it can be accessed by so many different demographics. Tobacco companies could be taking advantage of the internet to promote products without violating the laws of tobacco advertising. Children appear to be especially vulnerable to tobacco marketing and the positive portrayal of smoking (Forsyth et. al, 2013). Forsyth et. al conducted a literature review which found that exposure to tobacco images in the media plays a causative role in teenage smoking (2013).

It is important to understand the exposure to tobacco via the internet. According to the CDC, 39.2% of high school students saw advertisements for tobacco products (2005). Jenssen et. al. performed a content analysis of web pages to determine the amount of exposure tobacco images (2009). This study found that social networking sites like Facebook and Myspace represented the majority of sites with tobacco related content. Another web content analysis was done for hookah smoking establishments by Primack et. al.. This study found that for the websites promoting hookah establishments none required age verification, few very had any warnings related to tobacco, but instead promoted the pleasurable aspects of hookah use (Primack et. al., 2012).

YouTube is a highly visited website in which users upload video that can be viewed by other users. Carroll et. al wanted to determine the presence of cigarette and hookah related videos on this website (2013). This study found that there were substantially more cigarette related videos but that hookah related videos were more likely to be portrayed in a positive way (Carroll et. al., 2013). Facebook is another popular social networking website that could be utilized by tobacco companies. Brockman et. al. analyzed Facebook user profiles to determine the popularity of hookah among participants (2012). This study found that a quarter of the

participant endorsed hookah use on their profiles. Facebook can allow tobacco companies to bypass the WHO and FDA tobacco advertisement policies. Freeman & Chapman found that British American Tobacco employees were actively promoting products through Facebook profiles (2010).

Health Practices and Social Media

While the internet can be used by tobacco companies to promote unhealthy behaviors, it can also be used by public health workers to promote healthy behaviors. Social networking sites are especially important for health care. Moorhead et. al. conducted a systematic review and found the benefits and limitations of using social media for health care (2013). The main benefits of using social media were increased interaction with others, more tailored information is available, increased access to health information, peer/emotional support, public health surveillance, and influence on health policy. The limitations mainly consisted of quality and reliability concerns, lack of confidentiality and lack of privacy. Another study found that social media is penetrating the US population independent of education, race/ethnicity or health care access but that use of social media decreases in older age groups. (Chou et. al., 2009) This study recommended that social media should be used for health communication as long as the target population is the population using social media. Tobacco reduction programs could benefit from using social media because younger populations are at the greatest risk for initiation of tobacco use and also the most likely to use social media.

Summary

The literature available on the topics of hookah use, the internet, and tobacco control policies provide a vast amount of information which all need to be examined further. Since hookah is an increasing trend, policy makers need to understand why people choose to use

hookah and what is influencing people's perception of hookah. It is possible that how a person uses the internet can change the perceptions a person holds. This relationship between perceptions and the internet needs to be understood if policy makers, public health workers, and health care providers want to be able to control hookah tobacco use. If there is a relationship found then tobacco control policies can be altered to directly address the issues of the internet influencing hookah tobacco use.

Research Questions

Research Question 1: What are the risk perceptions of hookah use in this sample?
Research Question 2: What are the most and least utilized ways that participants use the internet?
Research Questions 3: What is the relationship between hookah risk perceptions and internet use?
Research Question 4: Are there any differences between gender and ethnicity and internet use?
Research Question 5: Are there any differences between gender and ethnicity and risk perceptions?

Chapter 3
METHODS AND PROCEDURES

Background

This purpose of this study was to examine the relationship between internet use and risk perceptions of hookah. The data used in this study are secondary and are deidentified. This survey was developed for the purpose of this original study after an initial review of hookah literature and focus group data was collected. A total of 1049 participants were included. This study was approved by Georgia State University Institutional Review Board (IRB) on February 7, 2014. The data used in this study were collected by Dr. Kymberle Sterling and colleagues in 2013 from March to April. The original study was funded by the American Lung Association and its goal was to understand the prevalence rates and psychosocial factors associated with hookah smoking among young adult college students.

Data Collection

Data were collected from Georgia State University and University of Georgia, which are two large public universities. At each institution, a random sample of 5000 student email addresses and demographic data of eligible students were obtained. These students were contacted via email and asked to participate in the study. Emails were sent three times to each participant. Students who agreed to the study completed a self-administered web-based survey.

Participant Eligibility

Students were considered eligible if they were college students enrolled at least part-time at either Georgia State University or the University of Georgia. The participants had to be between the ages of 18-30 years old. The participants must also be able to read English. 1050 (response rate of 10.5%) participants responded to the survey. However, a respondent was excluded because of the age requirements. This yielded a total of 1049 survey respondents.

Study Variables

Sociodemographic Factors

Demographic variables were collected during the survey. For the purpose of this study, the main demographic variables looked at were gender (male or female), age, and ethnicity. Ethnicity was categorized into (1)American Indian/Alaska Native/Native Hawaiian, (2) Asian or Pacific Islander, (3) Black Non-Hispanic, (4) Black Hispanic or Latino, (5) White Non-Hispanic, (6) White Hispanic or Latino, (7) Biracial or Multiracial, (8) Other. Variable relating to school attendance, enrollment status, primary residence, and marital status were also considered for this study.

Hookah Tobacco Smoking

Hookah smoking was measured using two variables. The first was to establish how many participants had ever used hookah. The second variable asked participants how many days they had smoked hookah tobacco in the past 30 days which established the current hookah smokers from the non-current hookah smokers.

Internet Usage

Internet usage was determined based on how long participants used the internet on the (1) weekday at daytime, (2) weekdays at evenings, and (3) during the weekend. Questions about how participants used the internet were then asked. Participants were asked how often they used the internet for the following reasons: (1)meeting new people or dating, (2) contacting friends, (3) email, (4) instant messaging, (5) creating or maintaining a web page, (6) playing games, (7) homework/research/work related use, (8) listening to music, (9) shopping, (10)sports, (11) news, (12) music/theater/arts, (13) getting information about health or medicine, and (14) spiritual/religious topics.

Risk Comparisons and Perceptions

Risk comparisons were assessed by asking participants to compare the risk of hookah to cigarettes. For example, they were asked which delivers more nicotine and could choose (1) “cigarettes”, (2) “hookah”, (3) “both cigarettes and hookah”, or (4) “neither”. The participants were also asked to determine how likely they were to develop diseases and nicotine addiction if they continued to smoke hookah in order to determine risk perceptions. For example, they were asked how likely would it be that they developed cardiovascular disease if they continued to smoke hookah and could choose (1) “no chance”, (2) “very unlikely”, (3) “moderately likely”, (4) “likely”, (5) “very likely”, an (6) “certain to happen”. Based on these questions, a participant’s risk perceptions can be determined.

Statistical Analysis

All analysis was completed with SPSS 20. Frequencies and percentages of demographic variables, internet use, and risk perceptions were determined. Pearson correlations and chi-squared test were used to compare whether there was any relationship between internet usage and risk perceptions. Chi-squared test were also used to determine the relationships among internet use and risk perceptions compared by age and ethnicity.

Chapter 4
RESULTS

Demographics

This sample contained a wide variety of participants. However, the majority of the participants were female (61.4%), White Non-Hispanic (57.7%), full-time students (87.4%) and attended the University of Georgia (62.4%). The participant's ages ranged from 18 to 31 years of age with the average age of a participant being 22 years. The full demographic profile can be found in Table 1.

Hookah Tobacco Use

This sample included both hookah users and non-hookah users. Table 2 shows how many participants have ever used hookah tobacco and how many have used hookah in the past 30 days. Majority of participants (66.1 %) had used hookah before. However, 44.3 % had not used hookah in the past 30 day. Only a small portion of participants used hookah more than 10 days out of the month.

Risk Comparisons of Hookah and Cigarettes

The participants were asked to compare addictiveness, chemical contaminants, and diseases associated with cigarettes and hookah. The comparisons can be found in Table 3. Overall, participants believed that cigarettes delivered more toxins, were more addictive, and more likely to be associated with cancer. When participants were asked if hookah or cigarettes were more addictive, there was a large gap in the percentages. 46.9% of participants believed that only cigarettes were more addictive compared to the 10.0% of participants who believed that both cigarettes and hookah were addictive. More participants believed that both cigarettes and hookah (53.6%) had been associated with heart disease compared to only cigarettes (42.4%). It should be noted that the large majority of participants did not believe that only hookah was

associated with addictiveness, chemical toxins, and diseases. A very small proportion of participants believe that neither cigarettes nor hookah had any risk associated with use.

Risk Perceptions of Nicotine Dependence and Disease Development

Participants were also asked about the likelihood of becoming addicted to nicotine and developing diseases if they used hookah. Table 4 shows the risk perceptions for hookah use. When asked about possible addiction to nicotine, 17.9% of participants believed that it was 'very unlikely'. The risk of developing diseases was a 'moderately likely' risk (18.8% for cardiovascular disease, 19.4% for respiratory effects, 18% for cancer, and 19.7% for other bodily effects.

Internet Use

Participants were asked multiple questions about their internet use, both with time spent on the internet (Table 5) and how often the participant used the internet for a specific reason (Table 6). Participants seemed to spend about 1-2 hours on the internet during the weekdays and about 3-4 hours on the weekend. The most utilized ways the participants used the internet were for email, homework/research/work, listening to music, and contacting friends. Participants hardly used the internet for meeting new people, creating or maintaining webpages, playing games, and for spiritual/religious topics.

Relationship between Internet Use and Risk Perceptions

Pearson correlations were done to compare the relationship between how a participant used the internet and their risk perceptions. These correlations can be found in Table 7. Participants were more likely to believe in a risk for cardiovascular disease if they used the internet for email (r=.109), shopping (r=.089), news (r=.113), music/theater/art (r=.102), and health/medicine information (r=132). Risk perceptions of respiratory effects was correlated with

email (r=.151), homework/research/work (r=.097), shopping (r=.093), news (r=.118), and health/medicine information (r=.131). Risk perceptions for cancer were correlated with email (r=.105), shopping (r=.111), news (r=.081), music/theater/art (r=.111), and health/medicine information (r=.133). The risk perceptions of other bodily effects were correlated with email(r=.114), shopping (r=.090), news (r=.093), music/theater/art (r=.088), health/medicine information (r=.111). All correlations were significant at either the .05 or .01 level.

Table 8 shows Pearson chi-squared coefficients between risk perceptions and internet use. Nicotine addictions risk perceptions were associated with contacting friends (x^2=.048), playing games (x^2=.028), and listening to music (x^2=.031). Risk perceptions for cardiovascular disease were associated with contacting friends (x^2=.000), email (x^2=.000), homework/research/work (x^2= .011), listening to music (x^2=.030), shopping (x^2=.006), and news (x^2=.001). Risk perceptions for respiratory effects were associated with contacting friends (x^2=.000), email (x^2=.000), homework/research/work (x^2=.003), shopping (x^2=.000), news (x^2=.014), and getting health/medicine information (x^2=.006). Risk perceptions for cancer were associated with contacting friends (x^2=.002), email (x^2=.000), homework/research/work (x^2=.003), shopping (x^2=.009), music/theater/art (x^2=.017), and getting health/medicine information (x^2=.006). Risk perceptions for other bodily effects were associated with contacting friends (x^2=.000), email (x^2=.000), homework/research/work (x^2=.002), and shopping (x^2=.041). These associations were the only significantly results found at the .05 level for the chi-squared test.

Gender and Racial Differences in Risk Perception and Internet Use

Pearson chi-squared test were done to determine if there was any relationships found between gender and race when compared to internet use and risk perceptions. A test was

considered significant when $x^2 \leq .05$. Table 9 describes the chi-squared results for internet use compared to gender and ethnicity. Almost every chi-squared coefficient was significant for gender and internet use with the exception being: creating/maintaining a webpage (x^2=.147), listening to music (x^2=.288), and music/art/theater (x^2=.477). Females tended to use the internet more than males for everything except meeting new people, playing games, and sports. However, the results for instant messaging and news were very close which could be due to sample size. The associations for internet use and ethnicity were more varied. The most highly significant associations were between ethnicity and instant messaging, getting health/medicine information and music/theater/art which all $x^2 \leq .001$. Table 10 shows the chi-squared test between risk perceptions and gender and ethnicity. Out of these comparisons only two were found to be significant. These associations were between ethnicity and risk perception for cancer (x^2=.027) and between ethnicity and risk perceptions for other bodily effects (x^2=.038).

Table 1 Demographic Profile of Sample

	Frequency	Percentage
Gender		
Male	405	38.6
Female	643	61.4
Age		
18-20	408	38.8
21-23	363	34.5
24-26	163	15.6
27-29	93	8.9
30-31	18	1.7
Ethnicity		
American Indian, Alaska Native, Native Hawaiian	3	.3
Asian or Pacific Islander	151	14.4
Black Non-Hispanic	153	14.6
Black Hispanic or Latino	14	1.3
White Non-Hispanic	605	57.7
White Hispanic or Latino	57	5.4
Biracial or Multiracial	46	4.4
Other	19	1.8
Relationship Status		
Married	62	5.9
Living with Partner	78	7.4
Single/Never married	904	86.2
Divorced	3	.3
Widowed	1	.1
School		
Georgia State University	394	37.6
University of Georgia	654	62.4
Primary Residence		
Dorm/Residence Hall	235	22.4
Fraternity or Sorority House	32	3.1
University-affiliated Housing	3	.3
At Home with Parents	140	13.3
Off-campus Apartment or House	628	59.9
Somewhere Else	10	1.0
Enrollment Status		
Full-Time	906	87.4
Part-Time	131	12.6

Table 2 Past and Present Hookah Use

	Frequency	Percent
Ever Used Hookah		
Yes	693	66.1
No	351	33.5
Past 30 Day Hookah Use		
0	464	44.3
1-5	157	14.9
6-10	20	2.0
11-15	6	.6
16-20	8	.8
21-25	1	.1
26-30	3	.3

Table 3 Risk Comparisons between Cigarettes and Hookah

	Percentage			
	Hookah Only	Cigarettes Only	Both Hookah and Cigarettes	Neither
Delivers more nicotine	12.2	25.9	20.3	1.2
More addictive	1.9	46.9	10.0	1.0
Delivers more carbon monoxide	10.2	27.2	21.2	1.2
Produces more tar	7.5	40.5	11.5	.5
Produces more arsenic and lead	5.2	39.8	12.9	1.8
Has been associated with heart disease	1.2	42.4	53.6	1.9
Has been associated with cancer	.8	25.6	33.0	.4

Table 4 Risk Perceptions of Hookah Use

	Percentage						
	No Chance	Very Unlikely	Unlikely	Moderately Likely	Likely	Very Likely	Certain to Happen
Developing nicotine addiction	13.1	17.9	10.5	10.5	5.0	1.9	1.3
Developing cardiovascular disease	3.3	9.6	11.8	18.8	10.4	4.8	1.3
Developing respiratory effects	2.3	7.1	7.3	19.4	11.8	8.6	3.4
Developing cancer	2.9	9.7	13.1	18.0	10.0	4.9	1.4
Other bodily effects	2.6	8.5	10.7	19.7	10.8	5.2	2.5

Table 5 Time Spent on the Internet in a Week

	Percentage					
	<10 minutes	10-30 minutes	30-60 minutes	1-2 hours	2-3 hours	3-4 hours
Weekdays-daytime	1.1	5.4	11.4	23.5	16.5	12.4
Weekdays-evening	1.3	2.8	8.9	21.5	20.6	15.9
Weekends	1.0	2.8	7.7	13.6	15.3	15.6

Table 6 Internet Use by Participants

How often do you use the Internet for:	Percentage				
	Never	Rarely	Sometimes	Quite Often	Very Often
Meeting new people	43.1	31.6	14.4	2.6	1.4
Contacting friends	1.7	4.3	17.7	35.6	33.4
Email	.6	.7	7.1	24.0	60.5
Instant Messaging	20.2	22.6	22.1	12.6	15.4
Creating/Maintaining a Webpage	47.8	19.7	12.0	7.7	5.9
Playing games	31.3	27.0	18.6	8.3	8.0
Homework/Research/Work	.7	1.1	6.8	25.0	59.2
Listening to music	1.3	5.1	14.5	26.0	46.2
Shopping	2.3	16.0	36.6	23.6	14.6
Sports	29.2	22.4	18.5	11.5	11.3
News	5.7	13.3	29.0	23.1	21.5
Music/Theater/Arts	14.4	21.4	26.3	16.4	14.4
Health/Medicine Information	8.3	21.1	34.8	19.4	9.5
Spiritual/Religious Topics	29.8	30.7	20.5	7.2	4.7

Table 7 Pearson Correlations between Internet use and Risk Perception

How likely are you to:					
How often do you use the internet for:	Develop Nicotine Addiction	Develop Cardiovascular Disease	Develop Respiratory Effects	Develop Cancer	Develop Other Bodily effects
Meeting new people	.067	-.002	-.044	.031	.005
Contacting friends	.012	-.008	.028	.024	.022
Email	.042	.109**	.151**	.105**	.114**
Instant Messaging	.015	.023	.006	.013	.001
Creating/Maintaining a Website	-.008	-.003	.007	-.011	.006
Playing games	.068	-.003	-.022	.006	-.011
Homework/Research/Work	-.007	.066	.097*	.060	.045
Listening to music	-.002	.020	.043	.010	.000
Shopping	.043	.089*	.093*	.111**	.090*
Sports	-.078	.022	.009	-.032	.002
News	.008	.113**	.118**	.081*	.093*
Music/Theater/Art	.069	.102*	.074	.111**	.088*
Health/Medicine Information	.034	.132**	.131**	.133**	.111**
Spiritual/Religious topics	.061	.057	.043	.052	.066

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

Table 8 Pearson Chi Square Associations between Risk Perceptions and Internet Use

How likely are you to:					
How often do you use the internet for:	Develop Nicotine Addiction	Develop Cardiovascular Disease	Develop Respiratory Effects	Develop Cancer	Develop Other Bodily effects
Meeting new people	.406	.224	.106	.571	.388
Contacting friends	.048*	.000*	.000*	.002*	.000*
Email	.195	.000*	.000*	.000*	.000*
Instant Messaging	.695	.091	.388	.189	.138
Creating/Maintaining a Website	.136	.262	.684	.706	.262
Playing games	.028*	.769	.900	.479	.270
Homework/Research/Work	.606	.011*	.003*	.003*	.002*
Listening to music	.031*	.030*	.085	.366	.113
Shopping	.835	.006*	.000*	.009*	.041*
Sports	.443	.086	.066	.344	.604
News	.312	.001*	.014*	.190	.122
Music/Theater/Art	.064	.098	.151	.017*	.065
Health/Medicine Information	.407	.163	.006*	.006*	.076
Spiritual/Religious topics	.155	.572	.635	.532	.595

*. Chi-square is significant

Table 9 Pearson Chi Square Associations for Internet Use by Gender and Ethnicity

How often do you use the internet for:	Gender	Ethnicity
Meeting new people	.000*	.113
Contacting friends	.000*	.042*
Email	.015*	.000*
Instant Messaging	.000*	.009*
Creating/Maintaining a Website	.147	.157
Playing games	.000*	.009*
Homework/Research/Work	.024*	.013*
Listening to music	.288	.263
Shopping	.001*	.603
Sports	.000*	.585
News	.000*	.297
Music/Theater/Art	.477	.001*
Health/Medicine Information	.002*	.000*
Spiritual/Religious topics	.023*	.004*

*. Chi-square is significant

Table 10 Pearson Chi Squared Associations for Risk Perceptions by Gender and Ethnicity

How Likely are you to:	Gender	Ethnicity
Develop nicotine addiction	.200	.893
Developing cardiovascular disease	.102	.537
Developing respiratory effects	.840	.191
Developing cancer	.434	.027*
Other bodily Effects	.120	.038*

*. Chi-square is significant

CHAPTER 5
DISCUSSION & CONCLUSIONS

The results showed that participants believed that cigarettes were more addicting, delivered more toxins, and more likely to be associated with cancer. An interesting find was that 42.4% of participants believed that both cigarettes and hookah were associated with heart disease. Participants were more likely to believe that developing a disease was more likely than nicotine addiction for hookah. This confirms the first hypothesis of this study. There were also interesting results for how participants utilized the internet. The most utilized ways of using the internet were mostly for leisure (email, music, and contacting friends) but homework/research/work purposes was also used very frequently. The least utilized way of using the internet were spilt between leisure activities like meeting new people and playing games and more practical uses like creating webpages. This confirmed the second hypothesis of this study.

There were many interesting findings when exploring the relationship between risk perceptions and internet use. The most surprising result was that there was no relationship found between internet use and the risk perception for developing a nicotine addiction. It is unclear why this risk perception was the only one not found to be related to any form of internet use. The association that does seem out of place is more time spent shopping and increase acknowledgement of risks. This could possibly be explained by the fact that hookah items are sold and marketed on the internet which could lead a person to research the risks when they come across these items. This relationship needs further examination. The most highly correlated finding was between getting health/medicine information and all risk perceptions except nicotine addiction. This makes sense because the more time a person spend researching health information, the more likely they are to be aware of more accurate information regard hookah

risk. The third hypothesis was only half way confirmed by this information since there was no negative relationship found between more leisure activities and lower risk perceptions.

The fourth hypothesis was confirmed by the results. Internet use was very different between both gender and ethnicity. However, it is interesting that gender had more variation than ethnicity. The fifth hypothesis was not confirmed by the results. There was no difference in gender and risk perceptions found at all. Ethnicity was only differed in two risk perceptions. This is interesting because it seems like sense there were difference in gender and ethnicity in internet use then there should also be difference in the risk perceptions.

It should be noted that all relationships that involved internet use is based on the types of websites that these participants visited. The views expressed on those websites could be influencing the views of participants. For example, if a person visits a news site that is very anti-tobacco then that person might be more likely to believe that hookah is very risky. However, if the participants visited a news site that was more pro-tobacco use then they might be more likely to think that hookah is not that risky.

The present study agreed with the previous studies done on hookah risk perceptions. The study showed the same patterns found by Maziah et. al. (2014). This study also is in line with other research in the fact that participants used the internet for contacting friends (i.e. social media) which could lead participants to be exposed to tobacco related content (Carroll et. al., 2013).

Public health workers and health care workers could use the information in this study to possibly help form new tobacco control and prevention policies through the internet. In order to increase the knowledge of the risk associated with hookah, there should be more education through popular websites. For example, educational videos could be uploaded onto Youtube and

shared on other social media sites. Policies about tobacco advertising on the internet for all tobacco products should be implemented. There would be some problem with the feasibility when dealing with the internet. There would be problems of quality control of program or interventions. There would also be a problem privacy and confidentiality of website users (Moorhead et. al., 2013). This study's findings could influence the Family Smoking Prevention and Tobacco Control Act. The expansion of this law could be used to regulate hookah sales, regulate the contents of hookah tobacco, regulate hookah advertising and finally regulate warning labels on hookah products. The main issue that needs to be addressed is the loopholes associated with advertising tobacco products on the internet. While this may be hard to monitor and control, if advertising on the internet can be regulated than maybe there might be a decline in hookah tobacco use. These changes could help stop the spread of misperceptions about hookah through marketing by tobacco companies.

However, there is a need for more research in this area. Since this study is merely a cross-sectional survey of a small population, there needs to be more longitudinal research to see if hookah misperceptions held by young adults could be changed through internet educational inventions. There also needs to be further research into how specific social media sites influence risk perceptions of hookah by a larger populations. The research needed falls in line with the YouTube studies done by Primack et. al. and Carroll et. al.

This study does have some limitations. First of all, this was a cross-sectional study which means that there is no way to determine long term relationship between variables. In other words, there is a problem with the directionality of this study. This study also had a relativity small sample and low response rate which could have been the reason for the results. The response rate for internet surveys are typically around 20-30% which means that this low

response rate is very small. The response rate could have a large impact on the results of this study. Another limitation of this study is that this sample may not be very generalizable to the larger population because the sample did not have much variation in demographics. This study did not distinguish between hookah users and non-hookah users when looking at risk perceptions. This could have influenced the results because there might be a significant difference between those two groups. These issues should be addressed in future studies.

In conclusion, there is a relationship between risk perceptions for hookah and certain ways that the internet is used by young adults. More focused research is needed in order to fully understand how these relationships work. These findings can help influence tobacco interventions and tobacco policies related to the internet.

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