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Beliefs and Norms Associated with Smoking Tobacco Using a Waterpipe among College Students

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Abstract

This web-based, cross-sectional survey guided by the Theory of Reasoned Action (TRA), examined behavioral beliefs and normative beliefs associated with smoking tobacco using a waterpipe in a sample of 223 undergraduate college students. Beliefs and norms associated with waterpipe smoking intention were captured using the investigator-developed TRA Waterpipe Questionnaire. Significant behavioral beliefs that contributed to the prediction of smoking intentions included smoking tobacco with a waterpipe "will taste pleasant" and "will allow me to have a good time with my friends." Significant norms that emerged were perceived approval of waterpipe smoking from friends and significant others. Current smoking status, both waterpipe and cigarette, also contributed to the prediction of smoking intention. The variables of the TRA represent prime targets for intervention and provide useful information that can be used to tailor waterpipe prevention messages.

Keywords

Tobacco; smoking; college students; waterpipe

Tobacco use has many forms, all of which contain nicotine, and are thus highly addictive. Smoking tobacco using a waterpipe, a new and unconventional form of tobacco use, has become a new trend among college students and is associated with multiple health problems, including addiction, various cancers and pulmonary disease (Akl et al., 2010; American Lung Association [ALA], 2007). In fact, the increase in using a waterpipe to smoke tobacco among youth worldwide during the past decade may be the "second global tobacco epidemic since the cigarette" (Maziak, 2011, p.1). For the purpose of this study, waterpipe smoking is defined as a tobacco use method in which smoke passes through water before it is inhaled (Kandela, 2000; Maziak, Ward, Afifi Soweid, & Eissenberg, 2004). A typical waterpipe contains five parts: a bowl, head, base, hose, and mouthpiece (See Figure 1). The tobacco used to smoke a waterpipe does not burn in a self-sustaining manner, so charcoal is placed in the bowl on top of the tobacco. The coal is usually separated from the tobacco by a piece of perforated aluminum foil (World Health Organization [WHO], 2005).

I am currently a postdoctoral fellow at the University of Michigan. I have a PhD from the University of Virginia where my research focus was on alternative tobacco use in young adults. This paper is based off my dissertation work that was funded by the American Lung Association and Sigma Theta Tau to examine waterpipe smoking among college students.
Dr. Kulbok is a professor at the University of Virginia with an established research program focusing on youth tobacco prevention.

Although smoking tobacco using a waterpipe is a relatively new practice among young adults and college students in the United States (U.S.), research indicates that waterpipe smoking is common on many college campuses with current use rates being reported between 9% and 20% in this population (Eissenberg, Ward, Smith-Simone & Mazaik, 2008; Primack et al., 2008; Smith-Simone, Maziak, Ward, & Eissenberg, 2008). Research suggests that waterpipe smokers are more likely to be male and be poly-tobacco users (Dugas et al., 2010; Eissenberg et al., 2008; Jensen, Coretes, Engholm, Kremers & Gislum, 2010).

Researchers have explored the correlates of waterpipe smoking among college student populations to understand the motives behind this type of tobacco use. Smith (2006) in a cross-sectional study of 411 college freshmen from the U.S. reported an association between subjective norms or social norms (peer influence and perceived social acceptability) and waterpipe smoking. Primack and colleagues (2008) examined attitudes, norms and intentions towards waterpipe smoking among 647 undergraduate and graduate college students. In Primack's study a third of the sample considered waterpipe smoking to be socially acceptable and over half of the sample viewed waterpipe smoking as less dangerous than cigarette smoking. Finally, Smith-Simone and colleagues (2007) assessed attitudes towards waterpipe smoking in a convenience sample of 201 waterpipe smokers and reported common positive attitudes to include pleasant taste, pleasant smell, relaxing effects and the opportunity to socialize with friends.

International studies report findings similar to U.S. studies. For example, Maziak and colleagues (2004a) in a cross-sectional study of 587 college students in Syria found current waterpipe smoking was associated with being male, smoking cigarettes, having friends who smoke tobacco using a waterpipe and coming from a household where a greater number of waterpipes were used to smoke tobacco. In a similar study Maziak and colleagues (2004b) reported positive attitudes towards waterpipe smoking were related to its sweet smell, sweet taste and the appeal of spending leisure time socializing with friends. Negative attitudes stemmed from the smoke produced, pollution and the adverse health effects associated with use. Of the sample, 57% of men and 20% of female waterpipe smokers perceived family disapproval of their use.

Theoretical approaches to examining beliefs and norms associated with smoking tobacco using a waterpipe are lacking in the literature; therefore, the Theory of Reasoned Action (TRA) was used to guide this study. The TRA was designed by Fishbein and Ajzen (1975) to predict behavioral intention, actual subsequent behavior and its psychological determinants. The TRA provides a framework for identifying key behavioral beliefs and normative beliefs that affect behavior and behavioral intentions (Galanz, Rimmer & Viswanath, 2008). Behavioral beliefs refer to a group of beliefs that formulate one's attitude toward a behavior and determine intentions to perform this behavior in the future. Normative beliefs refer to a group of beliefs that formulate one's perceived social norms around a behavior and determine intentions to perform this behavior in the future. In order to design interventions that will affect behavior and behavioral intentions, it is imperative to focus on factors underlying these behaviors, such as behavioral beliefs and perceptions of norms or normative beliefs that are modifiable (Glanz et al., 2008). Findings from studies using the TRA serve to tailor health education messages and are necessary to design theory-driven interventions geared toward tobacco use (Glanz et al., 2008).

The purpose of this study was to identify significant behavioral beliefs and normative beliefs associated with intentions to smoke tobacco using a waterpipe in a sample of college students. Based on the review of the literature, smoking status and gender may also play a role in tobacco smoking intentions; therefore, these variables were included in the model.

Methods

Participants and Procedures

Students were recruited from the full-time undergraduate population at a public Mid-Atlantic university. A random sample of undergraduate email addresses (N=1,000) was obtained from the Office of Student Services to recruit participants. Students received an email to participate in the survey via Survey Gizmo. Students had two weeks to fill out the survey and received a reminder every three days to participate. Students who completed the survey were eligible to enter a lottery to win a $250 gift certificate to a popular bookstore.

Measures

Demographic and Tobacco Use Measures—Demographic data collection included age, sex, year in school, racial and/or ethnic identity. Current ("During the past thirty days have you tried smoking tobacco in a waterpipe even one or two puffs?") and ever ("Have you ever tried smoking tobacco in a waterpipe, even one or two puffs?") waterpipe smoking behavior was collected. Current and ever cigarette use was also collected. The cigarette items were from the 2007 Youth Risk Behavior Survey (CDC, 2007). The waterpipe measures used were from Smith's (2006) College Freshman Nicotine Study. All data was self-report.

Behavioral Beliefs and Normative Belief Measures—The TRA Waterpipe Questionnaire is a 37-item questionnaire designed to determine waterpipe smoking intention and behavior in college students. It is a modified version of the Fishbein-Ajzen-Hanson Questionnaire (FAHQ) to capture constructs of the TRA related to waterpipe use. The measures used to assess behavioral beliefs and normative beliefs associated with smoking tobacco using a waterpipe were developed for this study as part of the TRA Waterpipe Questionnaire. An elicitation study using free-response questions suggested by Ajzen (2002) was conducted to elicit salient beliefs and norms related to smoking tobacco using a waterpipe among college students. A convenience sample for the elicitation study was recruited from undergraduate summer classes at a public Mid-Atlantic university. The sample consisted of 58 undergraduate college students. Content analysis was done to determine salient beliefs and norms related to waterpipe smoking in this college population and were then used to construct the belief and norm scales of the TRA Waterpipe Questionnaire. Seven-point semantic differential scales ranging from "likely to unlikely" were used to capture six behavioral beliefs associated with waterpipe smoking. Seven-point semantic differential scales ranging from "approve to disapprove" were used to capture four normative beliefs associated with waterpipe smoking. Responses were scored on +3 to −3 scales and all scoring is in accordance with the FAHQ (Hanson, 1997). For the current study, the chronbach's alpha reliability coefficient for the behavioral belief scale was 0.85 in the total sample. The chronbach's alpha reliability coefficient for the normative belief scale was 0.87 in the total sample. (A list of items from each respective scale can be seen in Table 2 and 3.)

Outcome measure: Intention Measures—The intention items used in this study were adapted from the FAHQ, with waterpipe use substituted for cigarette use. Three 7-point semantic differential evaluative scales including "I intend to smoke tobacco using a waterpipe three months from now… "true/false", likely/unlikely and "probably/probably-not" were used to capture intention to smoke tobacco using a waterpipe in the next three months. Scoring was on a scale ranging from +3 to −3. The average of the three responses was the intention score. All scoring was in accordance with the FAHQ (Hanson, 1997). Chronbach's alpha reliability coefficient for this scale is 0.97 for the total sample.

Analysis

Data was analyzed using SPSS version 14. Descriptive statistics were calculated (means and standard deviations for continuous variables including age, and frequencies for categorical variables including sex, race, and year in school) for socio-demographic variables. Descriptive statistics (frequencies for categorical variables) were computed for current and ever waterpipe use and cigarette use. Chi-square analysis was used to compare distributions of all categorical variables by waterpipe smoking status (non-waterpipe smokers vs. ever-waterpipe smokers) and *t*-tests were used for continuous variables.

Multiple regression was then used to examine the association of the independent variables (behavioral beliefs and normative beliefs) and the dependent variable, waterpipe smoking intention. The models were adjusted for current and past waterpipe and cigarette smoking as well as sex. These variables are supported in the literature as significant predictors of waterpipe smoking and smoking intentions in college student populations (Dugas et al., 2010; Eissenberg et al., 2008; Primack et al., 2008; Ward et al., 2007). Because of sample size issues and the fact that the majority of our sample was Caucasian American, we did not include race in the adjusted model.

Results

Of the 1000 emails sent to the target population, only seven were undeliverable. Of the 993 college students who received the survey invitation, 261 (26%) completed the survey. Of these 261 students who completed the survey, two cases were eliminated because their surveys contained multivariate outliers; another 36 participants were eliminated from the analysis because of incomplete questionnaires leaving a final sample of 223 (23%). Two sample *t*-tests and *chi- square* tests were used to compare those cases dropped from analysis and those cases used for analysis on socio-demographic and tobacco use variables and there were no significant differences between these cases (Noonan, Kulbok & Yan, 2011).

Socio-demographic Variables

The mean age of the waterpipe smokers and non-waterpipe smokers was similar (19.5 vs. 20). More males (53%) were waterpipe smokers compared to non-smokers (33%). The majority of both smokers and nonsmokers were Caucasian Americans (65% vs. 75%). The majority of non-smokers were underclassmen (1st and 2nd year) compared to smokers, who were split relatively evenly between underclassmen and upperclassmen. (See Table 1.)

Tobacco use

Ever cigarette use was seen among 14% of non-waterpipe smokers and 72% of waterpipe smokers. Current cigarette use was only seen among waterpipe smokers and was seen in 30% of the sample. Current waterpipe smoking was seen among 22% of ever waterpipe smokers.

Behavioral Beliefs and Normative Beliefs Associated with Waterpipe Smoking

As displayed in Table 2 students who believed waterpipe smoking would allow them to have a “good time with friends” (B=.263, p<.001) and would “taste pleasant” (B=.287, p<.001) were more likely to have intentions to smoke in the future. The beliefs that smoking waterpipe will “give me a good buzz” (B=.026, p=.601) and that it is “safer than regular cigarette smoking” (B= .006, p=.914), although positively associated with intentions, did not significantly contribute to the prediction of intention. Similarly, beliefs that waterpipe smoking would “harm their health” (B= −.049, p=.398) and would “cost a lot of money” (B= −.060, p=.180) were negatively correlated with smoking intentions but did not significantly contribute to the prediction equation. Current waterpipe (B=1.6, p<.001) and

current cigarette smoking (*B*=.834, *p*<.001) significantly contributed to the prediction of smoking intentions.

In the next model examining normative beliefs, students who believed that their friends (*B*=.174, *p*<=.027) and significant others (*B*=.156, *p*=.042) would approve of their smoking were more likely to have intentions to smoke in the future (See Table 3). Perceived approval from parents (*B*=.095, *p*=.310) and siblings (*B*=.089, *p*=.244) although positively correlated with smoking intentions did not significantly contribute in predicting intentions. In this model sex (*B*= −.426, *p*=.015) contributed significantly with males having greater smoking intention. Past waterpipe smoking (*B*=.751, p=.001), current water smoking (*B*=1.8, *p*<.001) and current cigarette smoking (*B*=.781, *p*=.002) also significantly contributed to predicting intentions to smoke with those students who were past and current smokers having greater intentions to smoke in the future.

Discussion and Conclusions

The results of this theory-based study add to the current literature surrounding correlates of waterpipe smoking in the college student population. Significant behavioral beliefs that emerged, smoking waterpipe will allow me to have a good time with my friends and smoking waterpipe will taste pleasant are similar to those previously reported in college student samples (Eissenberg et al., 2008; Maziak et al., 2004b; Primack et al., 2008; Smith-Simone et al, 2008; Ward et al., 2007). Smoking tobacco using a waterpipe is a very social activity; therefore, it makes sense that the belief that waterpipe smoking would allow students to have a "good time with friends" would be significant predictor of intentions to smoke. Studies have also highlighted the social aspect of waterpipe smoking and its strong association with smoking cigarettes (Jamil, Elsouhag, Hiller, Arnetz, & Arnetz, 2010; Maziak et al., 2004b; Ward et al., 2007). In addition, because the tobacco used in waterpipe smoking is flavored, logically the taste appeals to students. The flavored tobacco used in waterpipes is viewed by many as a healthy choice because of the fruit flavoring (Dugas et al., 2010). In a study by Ashare and colleagues (2007), college students, both cigarette smokers and non-smokers, reported positive expectancies towards flavored tobacco, with positive expectancies predicting intentions to use. Unfortunately the tobacco used with waterpipes is not included in the new FDA regulation banning all flavored cigarettes, so this flavored tobacco is still available to lure young people.

The beliefs that waterpipe smoking is safer than regular cigarette smoking and that waterpipe smoking may be harmful to one's health were not significant predictors of intention to smoke tobacco using a waterpipe. These beliefs have been shown to be associated with smoking tobacco using a waterpipe in the literature (Aljarrah, Ababneh & Al-Delaimy, 2009; Primack et al., 2008; Ward et al., 2007). However, these beliefs were in the expected direction, the more students thought that smoking tobacco using a waterpipe was safer than cigarette smoking the more likely they were to have intentions to smoke. Furthermore, the more students thought that smoking tobacco using a waterpipe would not harm their health the more likely they were to have intentions to smoke. Low perceived risk or a lack of knowledge surrounding the risks of waterpipe smoking is a common phenomenon surrounding this type of tobacco use (Mazaik, 2010b). Prevention programs should focus on dispelling the myth that smoking tobacco using a waterpipe is a safer alternative to other tobacco products and that it is not harmful.

Perceived approval from friends and significant others predicted waterpipe smoking intentions. The more students thought that their friends and significant others would approve of smoking the more likely they were to have intentions to smoke. It appears that waterpipe smoking is socially acceptable in college student populations (Eissenberg et al., 2008;

Primack et al., 2008). This social acceptability normalizes this activity and may even prompt non-smokers to try waterpipe smoking. Strides need to be made to reduce the perceived acceptability of this type of tobacco use among.

For both models, the addition of sex and specific tobacco use behaviors contributed significantly to the variance in intention to smoke. After controlling for these variables the significant behavioral and normative beliefs did not account for a large amount of variance in intention to smoke, which may suggest that targeting poly-tobacco users and combining prevention messages for multiple forms of tobacco use may be efficacious and worthwhile in this population. Poly-tobacco use was seen in this sample of waterpipe smokers, with 72% of ever or lifetime waterpipe smokers also reporting ever or lifetime cigarette use, 30% reporting current cigarette use, and 30% reporting current waterpipe use. This seems to be a common theme in the current literature highlighting the association of waterpipe smoking with other tobacco use behaviors (Dugas et al., 2010; Eissenberg et al., 2008; Jensen et al., 2010). Recently, a study by Jensen and colleagues (2010) found that among males, those that smoked waterpipe were more likely to become regular cigarette smokers. This phenomenon of waterpipe smoking serving as a gateway to cigarette smoking or the reverse is extremely concerning and warrants further investigation.

This study provides valuable information about behavioral and normative beliefs associated with waterpipe smoking in a college student population. However, there are limitations in this current study that should be discussed. First, this study sample was relatively small, predominantly Caucasian American and from one institution which limits generalizability. The response rate for this study was 26%, which is low and therefore limits the external validity of the findings; however, this response rate is common for college student populations (Porter & Umbach, 2006). Furthermore, this study was cross-sectional, so causality between the significant behavioral and normative beliefs and the dependent variable of intention cannot be assumed. This study should be replicated using a prospective design. Finally, only behavioral and normative beliefs were examined in this study; motivations to comply with these beliefs were not examined and may play a role in determining intentions to smoke in the future.

Despite these limitations, this study provides information surrounding beliefs and norms that are associated with waterpipe smoking. Waterpipe smoking remains a popular new trend that threatens the health of college students and young people. Attention to this type of tobacco use is warranted from researchers, policy makers and healthcare practitioners to understand the motives behind use and to develop interventions to prevent or decrease use in this population. The results of this study serve as a starting point to develop interventions for those college students at risk, as well as targeting specific beliefs and norms surrounding use that are modifiable.

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Figure 1.
Typical Waterpipe used to Smoke Tobacco

Table 1

Characteristics of Students

Variable	Non- Waterpipe smokers (N=87)	Ever Waterpipe Smokers (N=136)	P value
Age: M (SD)	19.56 (1.3)	20.04 (1.3)	.408
Male (#, %)	29 (33)	73 (53)	.002*
Race: (#, %)			
Asian	16 (18.4)	13 (9.6)	
Black	6 (6.9)	1 (0.7)	
Caucasian	57 (65.5)	103 (75.7)	.022**
Hispanic	2 (2.3)	6 (4.4)	
Other	6 (6.9)	13 (9.6)	
Year in School: (#, %)			
Underclassmen (1st and 2nd year)	58 (66.7)	67 (49.3)	.011*
Upperclassmen (3rd and 4th year)	29 (33.3)	69 (50.7)	
Ever Cigarette Use: (#, %)			
Yes	13 (14.9)	98 (72.1)	<.001*
Current Cigarette Use: (#, %)			
Yes	0 (0)	42 (30.9)	
Current Waterpipe Use: (#, %)			
Yes	0 (0)	30 (22.1)	

*Significance at p=0.05

**4 cells with count less than 5

Table 2

Behavioral beliefs associated with waterpipe smoking intention

Variable	Regression Coefficient	Std. Error	P Value	95% CI	R^2
(Model 1: Behavioral Beliefs)					
"If I smoke tobacco using a waterpipe …"					
It will give me a good buzz	.026	.050	.601	(−0.72–.124)	.000
I will have a good time with friends	.263	.062	<.001*	(.141–.385)	.023
It will taste pleasant	.287	.059	<.001*	(.170–.404)	.029
I may harm my health	−.049	.057	.398	(.162–.065)	.001
It is safer then cigarette smoking	.006	.053	.914	(–.098–.109)	.000
It will cost a lot of money	−.060	.044	.180	(–.147–028)	.002
Sex	.070	.153	.648	(–.372–.232)	.000
Ever Waterpipe Use	.198	.202	.328	(–.597–.200)	.001
Current Waterpipe Use	1.636	.225	<.001*	(−2.08–−1.192)	.066
Ever Cigarette Use	.093	.185	.615	(–.457–.271)	.000
Current Cigarette Use	.834	.212	<.001*	(−1.253–−.415)	.019

* = $p < .05$

Table 3

Normative beliefs associated with waterpipe smoking intention

Variable	Regression Coefficient	Std. Error	P Value	95% CI	R^2
"If I smoke tobacco using a waterpipe my____ would approve/disapprove"					
Friends	.174	.078	.027*	(.020–.329)	.009
Parents	.095	.093	.310	(–.089–.279)	.002
Siblings	.089	.076	.244	(–.061–.238)	.003
Significant other	.156	.076	.042*	(.006–.305)	.008
Sex	−.426	.174	.015*	(−.769–−.083)	.001
Ever Waterpipe Use	.751	.225	.001*	(−1.195–−.307)	.020
Current Waterpipe Use	1.896	.262	<.001*	(−2.413–−1.38)	.092
Ever Cigarette Use	264	.218	.228	(–.694–−.166)	.003
Current Cigarette Use	.781	.247	.002*	(−1.269–−.293)	.018

* = $p < .05$