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Awareness of Health Effect of Shisha and Its Influence on Attitudes and Smoking Behaviouramong Students in Selected Public Universities in Nairobi County, Kenya.

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Abstract: The popularity of shisha and its use among university students is on a steady rise. Given that it is marketed as a safe and trendy, and because little preventive efforts have been put in place towards its demand reduction and supply suppression, many people may continue with its use unaware of its health consequences. Investigating the level of awareness of the health consequences of shisha and its influence on attitudes and smoking behavior is an important starting point in designing prevention efforts. This study employed the*ex-post-facto*correlational research design. Purposive and simplerandom sampling of 150 university students was done. A questionnaire consisting of an awareness and attitude test was used to collect data. Descriptive statistics, spearman's rank order correlation coefficient and the chi-square of associationwere used to analyze data at 5% level of significance. Findings indicated that there was a moderate negative correlation between influence of awareness of health effects of shisha and attitudes towards smoking shisha for both male and female respondents, $rs(57) = -.496$, $p < .05$ and $rs(93) = -.348$, $p < .05$ respectively. There was a statistically significant association between awareness of health effects of shisha and smoking behavior, $\chi^2(1) = 11.907$, $p = .003$. The study recommends that prevention efforts should focus on reversing the misconceptions on the health effects of shisha and also changing the attitudes towards it by means of psycho education.

Key words: *Shisha, Demand reduction, supply suppression, drug abuse prevention.*

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I. INTRODUCTION

What is Shisha?

Shisha is a method of smoking tobacco in which the vapor passes through water before inhalation. It is known by different terms depending on different regions and includes 'water pipe' 'bory' or 'gaza' in Egypt, Saudi Arab and Pakistan. In Jordan, Lebanon and Syria its known as 'Narghile' 'Nargile' or 'arghile' , while Hookah in the Indian Subcontinent. It is also known as "hubble bubble". (Sameerur, Sadiq, Parekh, Zubairi, Frossard, Khan 2012). In Kenya it is popularly known as shisha. This method of smoking tobacco was invented in the 16th century by a physician called Hakim Abul-FathGilani. He invented a device whose purpose was to pass smoke through water in an attempt to "purify the smoke", a concept that remains controversial among the medical fraternity (Maziak 2013).

Shisha consists of a head that contains tobacco separated from an array of coal by foil. The head is connected to a system of airtight pipes that draw tobacco smoke into a bowl which contains water. Then, as the smoker inhales through the hose, smoke is drawn in from the bowl to the smoker (Maziak 2013).

The use of shisha has even been made fashionable by adding flavours such as apple, grapes and mint (Murtaza, Abed, Ali, Adam and Brendan, 2015). The use of flavours makes it leave a pleasant smell unlike cigarettes.

Constituents of Shisha

Shisha smoking involves burning flavoured tobacco known as molasses using coal. When the smoker breathes in from the mouth piece, air is pulled through the apparatus into tobacco and coal. A number of chemical compounds are present in shisha. These include polycyclic aromatic hydrocarbons (PAH), volatile aldehydes, nitric oxide (NO), nicotine, furans and nanoparticles.

Tobacco, contains high levels of PAH, a carcinogenic compound. Coal contains high levels of PAH as well, especially benzo(a)pyrene, a potent carcinogen. Significant exposure to PAH may lead to development of malignancies after smoking shisha (Seetdjian, Saliba and shihadeh, 2010). The presence of volatile aldehydes

has been reported in shisha smoke including formaldehydes, acetaldehyde, acrolein, propionaldehyde and methacrolein. These chemicals have been correlated with various respiratory disorders, respiratory tract irritation, chronic obstructive pulmonary disease and lung cancer (Hamal, Chappell and Wild, 2013)

Prevalence of Shisha Smoking.

The use of shisha has its roots in the Mediterranean region but has gained popularity in the western countries including the USA,UK, Canada and Australia. In Lebanon, the global youth tobacco survey indicate that 59.8% of 13-15 year olds smoke shisha as opposed to 10% who smoked cigarettes. This indicates a foavourable perception of shisha compared to cigarettes.

A 12.6 % prevalence of shisha was observed in Saudi Arabia (Grekin, Ayna&Argileh 2008) while a 20% prevalence was observed in Malasia (Al-nagagar, Bobryshev, 2012). A study of Maziak, et al. (2004) of university students in Syria reported a 62.6% male and 29.8% female regular smokers of shisha.

According to the American lung foundation (2007) there has been a steady rise of prevalence of shisha use in the USA. The US department of health and human sciences (2015) records that 1 in 5 boys (17%) and 1 in 6 girls (15%) use shisha.

The prevalence of shisha use among university students is of great concern and points to the need for resolute efforts to avert the trend. A study by Brockman, Pumber, Christakis and Mareno (2012) revealed a 27.8% prevalence of shisha in two universities in the USA. Smith et al. (2011) reported that 40.3 % in one of the universities in the United States used Shisha.

Jamil, Hiller and Ernetz (2010) revealed 10% prevalence at the Wayne University. In Karachi University, 3.3% prevalence was revealed among daily smokers, 7.1 % were reported to be weekly smokers while 38.6% were occasional smokers. InSouth Africa the use of shisha among students is significantly high (Daniel &Roman, 2013). A study of 3582 undergraduate students revealed that two thirds of the respondents had smoked shisha before even if once or teice. 18% were currently smokingwith a majority (65%) being occational smokers (Vander, Banoobhai&Masiea, 2013).

Kenya has also seen an increase in shisha palours(daily nation April 13, 2015). The standard news papaers reported a souring number of shisha users that prompted the National Campaign Against Alcohol and drug use (NACADA) to ban 19 flavours of shisha. Theseflavours were banned for having been laced with drugs such as heroin, cocaine and marijuana.

Health Effects of Shisha

The health effect of shisha has been documented in several studies. Tobacco which is the main ingridient of shisha contains over 4800 different chemicals, of which 69 are carcinogenic (Sajid, Chauachi&Mahmood 2008). Indeed, smoking shisha causes a wide range of cancers including oral cancer, lung cancer and stomach cancer among others (Alk, Gaddam, Gunukala, Honeine, Jaoide& I rani, 2010).

The World Health Organization (WHO, 2005) notes that contrary to popular belief, the smoke that emerge from a water pipe contains toxicants known to cause cancer, heart disease and other diseases. WHO further notes that the intensity of smoking shisha is higher than that of smoking cigarette considering that cigarette smokers typically take 8-12 , 40-75 ml puffs over about 5-7 minutes and inhales 0.5 to 0.6 litres of smoke. In contrast shisha smoking sessions typically take 20 to 80 minutes during which a smoker inhale 50-200 puffs which range from about 0.15- 1 litre each. Thus, notes the WHO (2005) a shisha smoker inhales an equivalent of 100 cigarettes. A simmilar view is held by the British Heart Foundation. Due to the mode of smoking shisha and the frequency of puffing, the lengh of the smoking sessions,shiha smokers absorb higher concentration of toxins found in tobacco thereby increasing the hazards to the body.

The British Heart Foundation is unequivocal on the health effect of shisha. It is firm in its resolute that like cigarette, shisha contains nicotine, tat, carbon monoxide and heavy metals such as arsenic and lead. As a result, shisha smokers are at risk of the same kind of diseases as cigarette smokers. These include heart diseases, cancer, respiratory diseases and problems during pregnancies. According to The Center for Disease Control and Prevention, shisha tobacco and smoke contains many toxic agents that can cause clogged arteries and heart disease. The study by Jabbour, El Roueiheb and Sibai (2003) associated shisha with coronary heart disease , a variety of negative pulmonary out comes (Al-Fayez, Salleh, Ardawi and Zahran 1988) and bronchegeniccarcicoma (Nasrollahzadeh et al. 2008)

According to the American Lung Association (2011) shisha is typically smoked in groups with the same mouth piece passed from person to person. This is very likely to pass infections from one smoker to another. Although disposable mouth pieces are available they are scarcely used therefore infections spread unabated.

Recent research has shown that water pipe smoke contains a variety of toxicants found in cigarettes including aldehydes such as formaldehyde, acetaldehyde and acrolein. All these are compounds found in tobacco (Al Rashidi, shihadeh&Saliba, 2008). Studies have also revealed that relative to nonsmokers, both daily

shisha and cigarette smokers have higher levels of carcinoembryonic antigen (CEA), a protein associated with tumour formation (Sajid et al. 2007). Shisha also increases Micro-nucleus (MN) frequency, a marker for early identification of carcinogenesis (El-Setouhy et al. 2008)

Attitudes towards Shisha

Probably the greatest huddle in the fight against shisha lies in the favourable attitudes towards it among its smokers. The popular flavouring of shisha with such aromatic smells as apple, strawbelly, mint, cappuccino, and mint has worked to make it seem harmless and classy. The perception of shisha as a cool way to socialize is a leading cause of its use. In a study conducted in the USA among college students a majority of shisha users viewed it as socially acceptable. This is consistent with studies in south west Asia where the social theme dominated the patterns and predictors of shisha use (Maziak, Ward, soweid and Eissen, 2004). Shihadeh (2003) observed that most shisha users perceived it as "cool and trendy".

The misconception that passing smoke through water reduces its toxic effect (Shihade , 2003) has contributed a lot in shaping positive attitudes towards smoking shisha. There is also the misconception that shisha smoking is not addictive because the water used in the pipe absorbs/filters nicotine. This is however not true as evident in the studies of Neergaard, Singh, Job& Montgomery (2007) that reported 50% unsuccessful quit attempts.

Effective shisha prevention interventions should deal with these misconceptions related to health risks associated with its use as well as its value and stimulus for social behavior.

Statement of the Problem

The smoking of shisha has been on a steady rise in Kenya in the past decade especially among students in public universities. This drug is marketed as safe, trendy and glamorous and this has created favorable attitudes towards it. The recent ban on shisha makes it an illegal drug but without determining the factors that fuel its use and changing the accompanying attitudes this approach would do little to reduce demand and suppress its supply. This study therefore sought to determine the level of awareness of the health effect of the shisha and its influence on attitudes and smoking behavior among students in selected public universities in Nairobi County, Kenya. This would be a good starting point in influencing the prevention efforts against the use of shisha.

II. OBJECTIVES OF THE STUDY

The study was guided by the following objectives:

i. To determine the level of awareness of the health effects of shisha among students in public universities in Nairobi county, Kenya.
ii. To determine the attitudes towards shisha among students in public universities in Nairobi county, Kenya.
iii. To determine the relationship between the level of awareness of the health effects of shisha and attitudes and smoking behavior among students in public universities in Nairobi county, Kenya.

Hypothesis of the Study

The study was guided by the following hypothesis:

i. There is no statistically significant relationship between the level of awareness of the health effects of shisha and its attitudes among students in public universities in Kenya

ii. There is no statistically significant relationship between the level of awareness of the health effects of shisha its smoking behavior among students in public universities in Nairobi county, Kenya.

III. METHODOLOGY

This study employed a correlational *ex-post-facto* research design. Purposive, stratified and simple random sampling were employed to obtain a sample size of 150 university students who took part in the study. Two public university students were purposively selected for the study. The students were stratified according to the year of study. Within each stratum the researcher employed simple random sampling to obtain the actual participants in the study. Data was collected using a questionnaire that consisted of an awareness test of the health effects of shisha and a test on the students attitudes towards the substance as well as their smoking behavior. The data was analyzed using descriptive statistics including percentages means and standard deviations. Inferential statistics including the Spearman's rank-order correlation coefficient and the chi-square of association were used to determine the influence of awareness of health effects of shisha on attitudes towards smoking shisha.

IV. RESULTS AND DISCUSIONS

1.3 Awareness of shisha, its Health Effects and Smoking Behavior

The study sought to find out the respondents' awareness of shisha, its use and also the awareness of its health effects. Findings indicated that 87 % of the respondents were aware of shisha while only 11% lacked the awareness of shisha. 37% reported to have ever smoked shisha while 65% had not smoked. Out of those who smoked, 6% smoked frequently while 8% smoked very frequently. These finding are summarized in table1.

Table 1: Knowledge and Use of Shisha

Characteristic	Frequency	Percent
Knowledge about Shisha		
Yes	133	88.7
No	17	11.3
Total	**150**	**100.0**
Shisha Smoking Behavior		
Yes	52	34.7
No	98	65.3
Total	**150**	**100.0**
Frequency of Smoking Shisha		
Never	98	65.3
Very rarely	15	10.0
Rarely	14	9.3
Often	10	6.3
Very often	13	8.7
Total	**150**	**100.0**

Concerning the awareness of its health effects, respondents were provided with 10 statements on health effects of shisha. Respondents were required to indicate true, false or not sure on those statements. Those who indicated true had a score of 3, not sure had a score of 2 and false a score of 1. Since there were ten items in the scale the lowest possible score was 10 (1x10) and the highest possible score 30 (3x10). The scores were then subdivided into 3 levels; low (10 to 15), moderate (16 to 25) and high (26 to 30) awareness on shisha health effects. Table 2 and 3 is a summary of the descriptive analysis of the awareness of health effects of shisha.

Table 2: Descriptive analysis of the Awareness of Health Effects of Shisha

Awareness of Health Effects of Shisha	True		False		Not Sure	
	Freq	%	Freq	%	Freq	%
Shisha is less hazardous compared to tobacco and other drugs	37	24.7	57	38.0	54	36.0
Bubbling tobacco smoke through water makes shisha safe to smoke	20	13.3	63	42.0	64	42.7
Sharing shisha mouth piece poses serious risk of transmission of communicable diseases including colds, influenza, oral herpes	100	66.7	21	14.0	29	19.3
Shisha smoking exposes the smoker to a large volume of smoke than ordinary smoking	81	54.0	12	12.0	51	34.0
The amount of toxin in shisha is as high as that in cigarette	57	38.0	33	22.0	60	40.0
Babies born to women smoking shisha may be under weight	70	46.7	17	11.3	63	42.0
Shisha smoking has a negative effect on cardiovascular system	96	64.0	10	6.7	44	29.3
The level of carbon monoxide in shisha is higher than in cigarrete	56	37.3	16	10.7	78	52.0
Smoking shisha may cause a wide range of cancers including oral cancer, lung cancer, stomach cancer	85	56.7	16	10.7	49	32.7
Smoking shisha may cause infertility	43	28.7	18	12.0	89	59.3

Table 3: Summary of the Level of Awareness of the health effect of shisha

Level of Awareness	Frequency	Percent
Low awareness	6	4.0
Moderate awareness	94	62.7
High awareness	50	33.3
Total	**150**	**100.0**

From table 3, majority of respondents (62 %) had a moderate awareness of the health effects of shisha, while 33.3% had high awareness. Table 4 presents the means and standard deviation for the level of awareness of health effects of shisha.

Table 4:Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Level of awareness	150	12	30	23.34	3.973
Valid N	150				

As shown in table 4, the minimum score attained was 12, while the maximum was 30. The mean score was 23.34(SD=3.973) indicating that on average, the respondents had a moderate level of awareness of the health effects of shisha.

As seen in table two, 54% of the respondents had the awareness that smoking shisha exposed the smokers to larger volumes of smoke than the ordinary smoking. 38% were aware that shisha contained as high toxic substances as cigarettes. 37% reported an awareness of the high levels of carbon monoxide in shisha. this reflects the need to sensitize the university students on the toxic effects of shisha. 56% of the respondents were aware that smoking shisha caused a wide range of cancers including oral, lung and stomach cancers. It is important to take note of the 44% of the respondents who were either not aware of this cancerous effects of shisha.

The findings also revealed a lot of misconceptions about shisha. for instance 24% of the respondents were of the view that shisha is less hazardous compared to tobacco and other drugs. 13 % believed that bubbling tobacco smoke through water makes it safe. Given that university students are among the more informed than their age mates in the general population, the need of more sensitization to counter this misinformation is very necessary. Raising the level of awareness of the health effects of shisha would positively shape the attitude towards the substance.

Findingson Attitudes towards Shisha.

The researcher further sought to find out the attitudes of the respondents towards smoking shisha.Respondents were provided with 10 statements on a five point likert scale (1-strongly disagree, 2-strongly agree, 3-Not sure, 4-Agree, 5-Strongly agree).Since the total number of items on the scale was 10, the minimum possible score for an individual in the scale was 10 (1x10) and the maximum possible score was 50 (5x10). The scores were then categorized into three levels where scores ranging from 10 to 25 (level 1 and 2 of the likert scale) represented negative attitude towards smoking shisha, 26 to 35 (level 3 of the likert scale) moderate attitudes towards smoking shisha and scores ranging from 36 to 50 (level 4 and 5 of the likert scale) represented positive attitudes towards smoking of shisha. Summary of the findings are presented in the subsequent tables.

Table 5:Descriptive analysis of the Attitudes towards Smoking Shisha

Attitudes towards Smoking Shisha	Strongly Agree		Agree		Not Sure		Disagree		Strongly disagree	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Shisha smoking is a favorite pass time activity	20	13.3	21	14.0	4	2.7	40	26.7	65	43.3
Shisha smoking is cool and trendy	24	16.0	23	15.3	15	10.0	21	14.0	67	44.7
Shisha smoking raises no health concerns to me	11	7.3	12	8.0	34	22.7	40	26.7	53	35.3
Shisha smoking should be regulated just like cigarrete, alcohol and other drugs	52	34.7	48	32.0	21	14.0	13	8.7	16	10.7
More prevention efforts should be put in place just like other drugs	60	40.0	43	28.7	24	16.0	12	8.0	11	7.3
It's quite easy to quit smoking shisha	22	14.7	20	13.3	68	45.3	21	14.0	19	12.7
Herbal shisha is healthier than normal shisha	18	12.0	11	7.3	81	54.0	15	10.0	25	16.7
Shisha is an acceptable alternative to other drugs	13	8.7	15	10.0	41	27.3	45	30.0	36	24.0
The nicotine content in shisha is lower than in cigarrete	12	8.0	10	6.7	86	57.3	19	12.7	23	15.3
I would wish to quit smoking shisha	10	6.7	11	7.3	43	28.7	24	16.0	40	26.7

These findings tend to concur with the global trends concerning the attitudes towards shisha. It is important to take note of the 27% who felt that shisha smoking is a favorite pass time, a reflection of very positive attitudes towards shisha. The16 % who strongly agreed that smoking shisha is cool and trendy is another reflection of the rising glamour associated with shisha. The 15% who expressed that smoking shisha raises no health concern to them is an indication of a don't care attitude towards the effect of shisha. This reflects the need for a lot of sensitization on the effects of shisha.

Paradoxically, despite these views about shisha, 56% greed that shisha smoking should be regulated. This is an indication that many of the respondents were resigned to an external mechanismof control of the substance. Upholding and implementing the ban on shisha may therefore be a way forward in the prevention efforts.

However on average a majority of the students (62%) reported a negative attitude towards shisha. Although this is encouraging the, the 25% who held moderate attitudes and the 18% who held positive attitudes towards shisha reflect the need for more sensitization.

Table 6 summarizes the attitudes towards shisha.

Table 6: Attitudes towards Smoking of Shisha

Level of Attitude	Frequency	Percent
Negative Attitude	94	62.7
Moderate attitude	38	25.3
Positive attitude	18	12.0
Total	**150**	**100.0**

With these findings on the level of awareness of health effects of shisha and the attitudes towards it was then necessary to determine the relationship between these two variables

Influence of Awareness of Health Effects of Shisha on Attitudes towards Smoking Shisha

The researcher sought to find out how awareness of health effects of shisha influenced the attitudes of respondents towards smoking shisha. Spearman correlation coefficient was used to determine the relationship between awareness of health effects of shisha and attitudes towards smoking of shisha.Theresults are shown on table 7.

Table 7:Spearman Correlation results on relationship between awareness of health effects of shisha and attitudes towards its use

	Gender			Attitudes towards smoking shisha
Spearman's rho	Male	Q7c	Correlation Coefficient	-.496**
			Sig. (2-tailed)	.000
			N	57
	Female	Q7c	Correlation Coefficient	-.348**
			Sig. (2-tailed)	.001
			N	93

A Spearman's rank-order correlation coefficient was run to assess the influence of awareness of health effects of shisha on attitudes towards smoking shisha.There was a moderate negative correlation between influence of awareness of health effects of shisha and attitudes towards smoking shisha for both male and female respondents, $r_s(57) = -.496$, $p < .05$ and $r_s(93) = -.348$, $p < .05$ respectively. The hypothesis that stated that there is no statistically significant relationship between awareness of the health effects of shisha and attitudes towards smoking was rejected ($p < .05$) These findings indicate that an increase in awareness on the health effects of shisha was associated with negative attitudes towards smoking of shisha. It therefore means that concerted efforts need to focus on creating awareness on the health effects of shisha among the university students. This would be especially useful especially to counter the misconceptionsassociated with shisha

1.5.2 Influence of Awareness of Health Effects of Shisha onSmoking Behavior

The study also sought to find out how awareness of health effects of shisha influenced the smoking behaviours of the respondents. Chi-square of association was used to determine the relationship between awareness of health effects of shisha and smoking behaviors of respondents. The findings are shown in the subsequent tables.

Table 8:Chi-Square of Association Cross tabulation

			Awareness of shisha health effects			
			Low awareness	Moderate awareness	High awareness	Total
Smoking Behavior	Yes	Count	6	31	15	52
		Expected Count	2.1	32.6	17.3	52.0
		% within Smoking Shisha	11.5%	59.6%	28.8%	100.0%
		% within Q7c	100.0%	33.0%	30.0%	34.7%
		% of Total	4.0%	20.7%	10.0%	34.7%
	No	Count	0	63	35	98
		Expected Count	3.9	61.4	32.7	98.0
		% within Smoking Shisha	0.0%	64.3%	35.7%	100.0%
		% within Q7c	0.0%	67.0%	70.0%	65.3%
		% of Total	0.0%	42.0%	23.3%	65.3%
Total		Count	6	94	50	150
		Expected Count	6.0	94.0	50.0	150.0
		% within Smoking Shisha	4.0%	62.7%	33.3%	100.0%
		% within Q7c	100.0%	100.0%	100.0%	100.0%
		% of Total	4.0%	62.7%	33.3%	100.0%

As shown in table 8, the respondents who indicated yes for having smoked shisha, the actual count was less than the expected by 2.3 for those who had high awareness, while those who had low awareness the actual count was more than the expected count by 4.1. Those who indicated no for having smoked shisha, the actual count was more than the expected count by 3.7 for high awareness. This indicates that most of the respondents who smoked shisha had low awareness on its health effects.

Table 9 presents the findings on the chi-square of association between awareness of health effects of shisha and smoking behavior.

Table 9 :Chi-Square of Association Results

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	11.907[a]	2	.003
Likelihood Ratio	13.324	2	.001
Linear-by-Linear Association	3.980	1	.046
N of Valid Cases	150		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 2.08.

A chi-square test for association was conducted between awareness of health effects of shisha and smoking behavior. All expected cell frequencies were greater than five except two. There was a statistically significant association between awareness of health effects of shisha and smoking behavior, $\chi^2(1) = 11.907$, $p = .003$, thus the hypothesis that there is no statistically significant relationship between awareness of health effects of shisha and smoking behaviors was rejected ($p<.05$). It therefore means that the higher the level of awareness on health effects shisha, the less likely one is to smoke the substance. It therefore emphasis that more effort towards prevention of smoking shisha should focus on educating the vulnerable populations on its health effects.

V. CONCLUSION

The study concluded that the majority of the students in public universities had a moderate level of awareness on the health effects of shisha. As well, a majority of the students had a negative attitude towards shisha. The study determined that there was a statistically significant relationship between the level of awareness of the health effects of shisha and attitudes and smoking behavior among students in public universities in Nairobi County, Kenya.

VI. RECOMMENDATIONS

This study takes cognizance of the recent ban on shisha in Kenya by the ministry of health. Effectively, shisha joins the list of illegal substances including illicit brews, marijuana, heroin and cocaine among others. This study supports the ban but notes that while banning shisha makes itillegal and will reduce its use publicly,the Ministry ofHealth and that of Education and all other stakeholders should engage in psycho-education on the health consequences of shisha. In line with the findings of this study more efforts should go to demystifying the claim on harm reduction and safety of shisha and changing the favourable attitudes towards shisha.

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