

Knowledge, attitude and perception of water pipe smoking (Shisha) among adolescents aged 14-19 years

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Abstract

Objective: To study the impact of educational intervention on knowledge, attitude and practices with regard to water pipe smoking among adolescents (14-19 years old) in Karachi.

Methods: A cross-sectional survey of adolescents aged 14-19 years studying at different educational institutions of Karachi, Pakistan was conducted through multistage sampling on a pre-tested self-administered questionnaire. They were divided into high, middle and lower socioeconomic strata on the basis of monthly fee structure. The impact of health messages was assessed two months after education sessions through post-test of only high and middle socioeconomic strata.

Results: A total of 646 students were surveyed for the pre test and 250 students for the post test. A significant association was found for water pipe smoking among the socioeconomic class ($p < 0.001$). Water pipe is more addictive as compared to cigarettes was marked by more students after the sessions (54% vs 68%; $p < 0.001$). A significant difference was seen for water pipe being more socially acceptable (58% vs 80%; $p < 0.001$), it is part of our cultural heritage (29% vs 58%; $p < 0.001$).

Conclusion: Shisha smoking was more prevalent among the high socio economic group, which might be because of the cost, accessibility and availability. The knowledge of the students regarding water pipe smoking improved after the health awareness sessions (JPMA 58:312;2008).

Introduction

Water pipe smoking known by a variety of names like Shisha, Narghile, Ghoza, Hubble bubble and Hookah is in vogue for the last many centuries. Its origin from one historical account suggested that it was invented in India by a physician Hakim Abul Fath during the reign of Emperor Akbar as a less harmful method of tobacco use.¹ But some suggested that it was first used in South Africa, Persia, Ethiopia and other countries.² It has been claimed that greater than 100 million people worldwide smoke water pipe.² It has been a common practice in the Arabian

Peninsula, Turkey, India, Pakistan, Bangladesh and China.¹

In the subcontinent, water pipe traditionally known as Hookah has been part of culture in most rural areas. It is gaining popularity among the youth very recently especially in urban cities. Commonly known as shisha, this trend has started with mushrooming Arabian shisha cafes opening in posh localities. The target was the young generation but unfortunately adolescents and children have also been indulging in shisha smoking. Its acceptance socially might be because it is part of our cultural heritage. Other factors for its popularity include easy availability, attractive designs

and flavoured aromatic tobacco.³ In a survey conducted by the Aga Khan University, it was observed that over 90% of children have tried this form of tobacco. The sad part of the survey was that most of these youngsters did not know that shisha smoke contained tobacco.⁴

A study reported in Egyptian children revealed that 26% of the boys and 5% of the girls have used water pipe⁵, whereas in a similar study in Israeli children, 22% used water pipe at least once weekly.⁶ Another study conducted in a Beirut University, 31% males and 23% females reported weekly use of water pipe smoking⁷ as compared to Syria university students where half of them ever used water pipe smoking and quarter of them were using it currently.⁸

Dr Hussein A. Gezairy, Director WHO EMRO, in his message on World No-Tobacco Day, showed his concern about tobacco smoking emerging in various forms ranging from shisha (water pipe) to diversified pretexts in context of chewed tobacco and snuffed tobacco. He also referred to a recently conducted study among 15 to 35 years age group showing that 46.6% started smoking shisha before the age of 18 years.⁹ Moreover, the study revealed that 51% believed that shisha was less harmful than cigarettes (9).

The increasing trend of water pipe smoking observed in the last decade is accredited to the misconceptions regarding its use, for instance that nicotine content is lower than that of cigarettes and that water filters out all the noxious chemicals including carbon monoxide, nicotine and tar.¹⁰ However new research has suggested that the water pipes have three additional lethal risks over cigarette smoking.¹¹ flavoured tobacco is smoked over coals and fumes from these fuels add new toxins to the already dangerous smoke; shisha smokers inhale up to 200 times more smoke in a single shisha session than from a cigarette; and its social acceptance has resulted in high levels of secondhand smoke.

Despite the fact that water pipe smoking is widely used, little is known about patterns of water pipe smoking and its health consequences. Recent studies being conducted are focusing on the health consequences of shisha smoking. Following the recent publication by the American Lung Association "An emerging Deadly Trend: Water pipe Tobacco Use".¹² Mostafa Mohamed, Professor of Community Medicine in Cairo said,

"Heat sources that are commonly used in shisha pipes to burn the tobacco are likely to increase the health risks because they produce toxins on burning putting shisha smokers and those around them at greater risk."

Dr Alan Shidaheh of the American University in Beirut stated, "Every recent study has found that shisha smoke contains large quantities of the chemicals that lead to

heart disease, cancer, and addiction in cigarette smokers".¹³

The recent research on the health consequences of water pipe smoking has given their recommendations to the WHO. The recommendations stated that "Water pipes should be subjected to the same regulations as cigarettes and other tobacco products. Water pipes and water pipe tobacco should contain health warnings."¹¹

Generally water pipe consists of four parts including head, body, water bowl and hose. The most common type of tobacco used in the water pipe is the Maassel^{9,13} which is sweetened and flavoured. Other forms of tobacco include Ajami, Tumbak and Jurak.¹³⁻¹⁵ The nicotine content of water pipe tobacco has been reported as 2% to 4%, vs. 1% to 3% for cigarettes. Carbon monoxide concentrations have been reported to be 0.34% to 1.40% for water pipe smoke and 0.41% for cigarette smoke.¹⁰

Tobacco, the primary component of water pipe smoking is placed in the head and often covered with perforated aluminum foil; burning charcoal is placed on top of the foil. Water fills half the bowl, submerging a tube through which smoke enters, but not the hose-connected tube through which smoke leaves. Thus, an inhalation at one end of the hose produces a vacuum in the air filled space of the water bowl, causing smoke to pass through the water producing bubbles, into the hose-connected tube, and thence to the smoker.¹⁶ Water pipe smokers might absorb higher concentrations of these toxins because of the smoke itself, or smoking for several hours at a time and inhaling the moisturized, less irritating smoke more deeply.¹⁰

Extensive work on cigarette smoking has been published in Pakistan but very little research exists on shisha smoking, especially among the younger generation. The increasing trend of smoking water pipe among youth is mostly attributed to lack of knowledge and the misconceptions regarding its use.

In order to address this emerging health risk, a study was conducted to determine the impact of educational intervention on knowledge, attitude and practices with regard to water pipe smoking among adolescents (14-19 years old) studying at various educational institutions in Karachi.

Methods

A cross-sectional survey of adolescents aged 14-19 years studying at different educational institutions of Karachi was conducted. The educational institutions were divided into three strata on the basis of socio-economic status (high, middle, low). High socio-economic group was defined as schools having a monthly fee structure above 4000 Pakistani rupees, middle socio-economic group was defined as schools having a fee structure between 1000-

4000 Pakistani rupees and low socio-economic group was defined as schools having a fee structure below 1000 Pakistani rupees. For each stratum, the institutions were selected by convenience and then from each institution proportionate number of students aged 14-19 years were selected through multistage sampling.

The impact of health education messages was assessed two months after initiation of education sessions through post-test on purposive sampling of only high and middle socioeconomic strata as the number of students in the low socioeconomic stratum indulged in water pipe smoking was very few.

The list of the institutions was taken from the Directorate of Schools and Colleges. The sample size was calculated with estimation that 25% adolescents from the upper class, 10% from the middle class and 2% from the lower class indulge in shisha smoking. Keeping equal number in each group, at 95% confidence interval and power of 80%, a sample size of 162 was obtained. A minimum of 200 participants from each stratum was planned to be selected keeping in view the non-response and invalid responses in the completed questionnaires, whereas for post-test, 40% from the total sample was to be selected, that is, 240 from 600 participants. The survey was completed on 646 participants for the pre-test and 250 for the post-test.

A pre-tested self administered questionnaire was used for data collection. The questions were mostly close ended, including information such as knowledge of water pipe smoking, water pipe use frequency, cigarette smoking status, current age, age of initiation of water pipe smoking and awareness regarding health hazards related to water pipe smoking. Eight interactive health sessions were conducted for students aged 14-19 years in the educational institutions who participated in the survey. The health hazards associated with shisha smoking were conveyed through handbills as take home messages. These were distributed not only to the participants of the survey but also to the parents of all school children attending health seminars on other health topics.

A written consent was taken from authorities of institutions where the survey was conducted and an informed verbal consent was taken from students who agreed to participate in the survey.

Data entry and analysis was done using computer software "Epi Info" version 6.0. Frequencies / proportions of qualitative variables and mean, standard deviation of quantitative variables are presented where necessary. Chi-square test of proportions was used to determine the association between gender and socioeconomic strata and other qualitative variables, and t-test was used for

determining statistical significance of quantitative variables. P-value <0.05 was considered significant.

Results

A total of 646 students filled the questionnaires for the pretest with a male to female ratio of 1.3 (males 57% and females 43%). Socioeconomic strata were taken as high, middle and low income groups. The mean age of students was 15.3±1.2 years (age range 14 to 19 years). The grades in which these students were studying ranged from class 9 to 11, 49% in class 9th, 38% in class 10th and 13% in class 11th. For post test, 250 students filled the questionnaires with a male to female ratio of 0.5 (males 37% and females 63%). Socioeconomic strata were taken as high and middle income groups. The mean age of students was 15.2±0.8 years (age range 14 to 19 years). The grades in which these students were studying ranged from class 9 to 11, 40% in class 9th, 56.8% in class 10th and 3.2% in class 11th. On comparison, no significant difference was observed in mean ages for both the groups (p=0.22), whereas a significant difference was seen in the male female ratio (p<0.001) and the grades in which students were studying (p<0.001).

In the pre test, the high socioeconomic class had the highest number of students (127 out of 196; 65%) indulged in water pipe smoking, followed by middle class (42 out of 310; 13.5%), while the low income group had the least number (4 out of 140; 3%). A statistically significant association was found for water pipe smoking among the socioeconomic class (p<0.001). In the post test, 40% (24 out of 60) of students from high socioeconomic class and 19% (36 out of 190) from middle income group were water pipe

Table 1. Water pipe smoking.

| Smoking status | Pre-test n=646 | | Post-test n=250 | | p-value |
|--|-------------------|----|--------------------|----|---------|
| | n | % | n | % | |
| Ever smoked water pipe | 173 | 27 | 60 | 24 | 0.37 |
| Current water pipe smoking | 109 | 17 | 34 | 14 | 0.27 |
| | n=109 | | n=34 | | |
| Share water pipe | 83 | 76 | 23 | 68 | 0.01 |
| Other addiction | 12 | 11 | 7 | 21 | <0.001 |
| Smokes usually at café | 82 | 75 | 26 | 77 | 0.56 |
| Smoking with friends/family | 99 | 91 | 29 | 85 | 0.007 |
| Smokes occasionally | 83 | 76 | 24 | 71 | 0.14 |
| Quit water pipe smoking | n=109 | | n=34 | | |
| Want to quit water pipe smoking | 35 | 32 | 18 | 53 | <0.001 |
| Attempt to quit water pipe smoking | 30 | 28 | 9 | 27 | 0.81 |
| Smoking intentions by non-smokers | n=537 | | n=216 | | |
| Try water pipe soon | 37 | 7 | 17 | 8 | 0.69 |

Table 2. Perceptions related to water pipe smoking.

| Health perceptions | Pre-test n=646 | | Post-test n=250 | | p-value |
|--|----------------|----|-----------------|----|---------|
| | n | % | n | % | |
| Opinion whether water pipe is addictive | 349 | 54 | 171 | 68 | <0.001 |
| Water pipe is more addictive compared to cigarette | 74 | 11 | 80 | 32 | <0.001 |
| Water pipe is more harmful compared to cigarette | 102 | 16 | 113 | 45 | <0.001 |
| Social perceptions | | | | | |
| People smoking water pipe look COOL | 154 | 24 | 59 | 24 | 0.99 |
| People smoking water pipe have more friends | 214 | 33 | 79 | 32 | 0.78 |
| Water pipe smoking is more socially acceptable compared to cigarette | 372 | 58 | 200 | 80 | <0.001 |
| Water pipe smoking is our cultural heritage | 188 | 29 | 146 | 58 | <0.001 |
| Girls are more comfortable in smoking water pipe compared to cigarette | 427 | 66 | 197 | 79 | <0.001 |
| Influences | | | | | |
| Immediate family / friends smoke water pipe | 285 | 44 | 109 | 44 | 0.99 |
| If friends smoking, you are obliged to follow | 109 | 17 | 52 | 21 | 0.19 |
| Shisha café are playing an important role in promotion of water pipe | 578 | 89 | 230 | 92 | 0.18 |
| Water pipe smoking makes boys more attractive | 120 | 19 | 51 | 20 | 0.74 |
| Water pipe smoking makes girls more attractive | 113 | 17 | 45 | 18 | 0.73 |

Table 3. Consequences of water pipe smoking on health.

| Health hazards | Pre test n=646 | | Post test n=250 | | p-value |
|-----------------------------|----------------|----|-----------------|----|---------|
| | Yes | % | Yes | % | |
| Cardiovascular effects | 155 | 24 | 26 | 10 | <0.001 |
| Respiratory effects | 451 | 70 | 180 | 72 | 0.55 |
| Cancer | 264 | 41 | 93 | 37 | 0.25 |
| Other bodily effects | 116 | 18 | 57 | 23 | 0.08 |
| Oral infections | 75 | 12 | 43 | 17 | 0.06 |
| None | 61 | 9 | 14 | 6 | 0.14 |
| Associated diseases | | | | | |
| Bladder cancer | 120 | 19 | 83 | 33 | <0.001 |
| Bronchitis | 324 | 50 | 140 | 56 | 0.12 |
| Oesophageal cancer | 188 | 29 | 87 | 35 | 0.07 |
| Depression | 163 | 25 | 58 | 23 | 0.56 |
| High blood pressure | 200 | 31 | 41 | 16 | <0.001 |
| Parkinson disease | 33 | 5 | 16 | 6 | 0.53 |
| Ulcer | 124 | 19 | 46 | 18 | 0.72 |
| Lip cancer | 229 | 35 | 183 | 61 | <0.001 |
| Impaired pulmonary function | 167 | 26 | 81 | 32 | 0.07 |
| Gum diseases | 152 | 24 | 59 | 24 | 0.99 |
| Infections | 228 | 35 | 84 | 34 | 0.78 |
| Infertility | 62 | 10 | 96 | 38 | <0.001 |

smokers (p<0.001).

No difference could be seen in the overall number of students whoever smoked water pipe after the sessions (27% vs 24%; p=0.37), or current smokers (17% vs 14%; p=0.27). Sharing of water pipe was common among 76%

smokers in pre test and 68% smokers in post test (p=0.01). Regarding any other addiction, 11% in the pre test and 21% in the post test said they were mostly taking cigarettes (p<0.001); others were taking pan, alcohol or betel nut. The mean age at which these students started smoking was 13.7±1.3 years for pre test and 13.8 ± 1.2 years in post test (p=0.29). Almost three quarter of students smoked at café or restaurants in both groups, remaining did it at either home or at other places (75% vs 77%; p=0.56). Majority (91%) did smoking with either friends or family in pre test while in post test it decreased to 85% (p=0.007). Occasional smoking was seen in 76% of the students in pre test and 71% in post test (p=0.14), while remaining were either daily smokers or did it on weekends as shown in Table 1. Over half the students were taking more than one flavours of shisha (55% vs 59%; p=0.69); the most favourite flavour was double apple, followed by strawberry and grapes. Majority (93% vs 97%; p=0.60) said that they preferred the flavour because of their self liking; others said because of friends.

In pre test, 32% said that they wanted to stop smoking and 28% made an attempt to stop it, while in post test 53% wanted to stop smoking and 27% made an attempt for it (p<0.001) as shown in Table 1. No significant difference was observed in factors behind quitting, yet the main motivation for quitting smoking was effect on health quoted by 74% vs 65% (p=0.28) of the students in pre and post test respectively. Those who failed to quit claimed addiction to be the most common reason (28% vs 33%; p=0.66).

Smoking susceptibility and intentions were asked

from those who were non-smokers (Table 2). In the pre test, out of 537 students, 473 were non-smokers and 64 were those who quit smoking. In the post test, out of 216 students, 190 were non-smokers and 26 were those who quit smoking. No difference was seen in those non-smokers trying a water pipe after the sessions (7% vs 8%; $p=0.69$)

Regarding health perceptions, the opinion of students to whether water pipe smoking is addictive increased after the intervention sessions (54% vs 68%; $p<0.001$). Knowledge about water pipe is more addictive than cigarettes increased among students from 11% to 32% ($p<0.001$) in the post test. Similarly awareness increased about whether water pipe is more harmful than cigarettes (16% vs 45%; $p<0.001$) as shown in Table 2.

The social perceptions related to water pipe smoking also attained significance for some of the variables as shown in Table 2. It is more socially acceptable in the society as compared to cigarette smoking (58% vs 80%; $p<0.001$); it is part of our cultural heritage (29% vs 58%; $p<0.001$); and girls feel more comfortable in smoking water pipe as compared to cigarettes (66% vs 79%; $p<0.001$).

The questions pertaining to influences did not attain any significance after the health education sessions as shown in table 2. The percentages remained almost the same (44%) for whether immediate friends and family smoke water pipe ($p=0.99$); and shisha café are playing an important role in promoting water pipe smoking (89% vs 92%; $p=0.18$).

The consequences of water pipe on health changed to a significant level for some variables after the intervention as shown in Table 3. The effect on cardiovascular system was marked by less number of students (24% vs 10%; $p<0.001$), whereas response to the effect on respiratory system was almost the same (70% vs 72%; $p=0.55$). The awareness regarding different types of cancers also reached significance: bladder cancer (19% vs 33%; $p<0.001$), lip cancer (35% vs 61%) ($p<0.001$).

Discussion

The knowledge and perceptions of adolescents about shisha smoking were assessed using a self administered questionnaire. Similar studies carried out in Israel showed that 37% adolescents had ever smoked a water pipe¹⁷ and a four-fold increase was observed in water pipe smokers from seventh to the ninth grade school children.⁶ The mean age of students initiating shisha smoking was 14 years in the current study, which is less than 19 years in an international study.¹⁸

In this study, highest percentage of shisha smoking

was observed among students belonging to the high socio-economic group. Surveys regarding changes in prevalence conducted in Beirut universities showed a significant rise within a span of one year.^{7,19,20} Almost 40% students from high income group were currently smoking shisha, however, a decrease to 22% was observed after the health awareness sessions. In comparison, the frequency in the middle class was 10% in the pretest which remained almost the same in the post test. Similar results were observed among clients of shisha cafes in Egypt revealing over half of them had tried to quit shisha smoking during last year.²¹

Perceptions regarding water pipe smoking changed significantly after intervention and the opinion regarding addiction associated with water pipe smoking improved. Highly significant difference was observed with regards to shisha being more addictive and harmful than cigarette smoking. Several studies conducted internationally showed a mixed response regarding the addictive and harmful effects of shisha smoking. In a study done on school children in Israel, 90% endorsed that water pipe was not healthy; while only 50% said that it was more harmful than cigarettes.⁶ A similar study carried out in Syrian university students, 30% were of the opinion that water pipe was less harmful than cigarettes.²² Another study carried out on Egyptian female university students revealed that 74% believed that shisha smoking was less harmful than cigarette smoking.²³ Social perceptions related to water pipe that it is more socially acceptable and part of our cultural heritage remain deep rooted and no significant difference was observed.

Majority of the students were of the opinion that shisha cafes play an important role in promoting shisha smoking. Most students said that shisha smoking is influenced by other people in close family circle smoking water pipe. Similar results were observed in a study conducted on customers of shisha cafes in Egypt.²¹ In a study carried out among school children in Israel, a quarter of the children who smoked did smoking also with their parents.⁶

Perceptions regarding health hazards associated with shisha smoking changed significantly after the health awareness sessions. The students attributed shisha smoking to all forms of cancers specifically those of lips, bladder and lung. Strong positive association was also observed with infertility, high blood pressure and cardiovascular problems.

The limitations of the study are that only a small sample could be surveyed studying in schools. The people visiting shisha cafes and restaurants were not assessed because of logistics, which would have been more representative of the situation. Stratified proportion of male

and female students could not be assessed for the post test as the students present at the time of post test were enrolled.

Conclusion

The results of the study concluded that shisha smoking was more prevalent among the high socio economic group. The knowledge of the participating students regarding water pipe smoking improved to some extent after the health awareness sessions especially in terms of health hazards associated with water pipe. This study helped in changing their perceptions regarding health hazards associated with shisha smoking.

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