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The effectiveness of the information compact disk and information pamphlet in improving knowledge about potential health risk of Shisha smoking among students in one Malaysia medical college

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ABSTRACT

Background: Shisha smokers believe that smoking Shisha is both harmless and non-addictive. However, it is believed that when they are exposed to the information on the health risks, they can reduce the frequency of smoking Shisha. And as had been highlighted by previous researchers, the two important steps to rectify the misconception on and prevention of shisha smoking among smokers in future are: An early educational exposure to the health risks among them and providing immediate protection for them at all the public areas of smoking Shisha. **Aim:** The aim of this study is to examine the effects of using the information compact disk (CD) and information pamphlet in improving the knowledge on the health risks of Shisha smoking among Shisha and non-Shisha smokers. **Methods:** This study is based on the experimental research design. Eighty respondents (40 Shisha smokers and 40 non-Shisha smokers) were conveniently selected from a private medical college. The respondents were then randomly assigned to the relevant experimental group and control group. The experimental group was given an information CD, whereas the control group was given an information pamphlet developed by researchers. **Results:** The use of information CD was found to be more effective than the pamphlet method in improving the knowledge on Shisha smoking in most of the health risk aspects among Shisha smokers. The information CD and pamphlet methods, however, did not show any significant difference in improving the health risks knowledge among the non-Shisha smokers. **Conclusion:** In the future, The Ministry of Health may have to focus more on developing more technology-based information rather than focusing only on using the pamphlets in disseminating information when promoting health programs. This is specifically important for the current computer-savvy younger generation.

KEY WORDS: Compact disk, college, knowledge, pamphlet, potential health risk, Shisha smoking

INTRODUCTION

Shisha refers to a mixture of tobacco, which is later sweetened and flavored with a variety of fruit flavors [1]. It is smoked by using a stand-up device called water pipe, which consists of a base, pipe, bowl and hose or mouthpiece. Therefore, Shisha smoking is also commonly known as water pipe smoking. In recent years, Shisha smoking has become a national and global trend, gaining popularity among University students [2-5]. The increase in its popularity among the younger generation had been found to be associated with its appealing sweet smell and taste of the Shisha. Its popularity can also be associated with its easy availability and cheap cost [6]. A systematic review of prevalence of Shisha smoking by Akl *et al.* [7] showedthat the prevalence of Shisha smoking is high due to the lack of knowledge or misconception about its health risks among the users. In general, Shisha smokers seem to believe that it is both non-addictive and harmless compared to cigarette smoking and hence, they believed they would not be exposed to risky diseases [5,6,8]. In reality, Shisha smoking is just as dangerous as cigarette smoking. According to WHO [9], Shisha smoke contains a higher level of metals such as arsenic, lead, nickel, chromium, cobalt, and tar content. Hence, Shisha smokers are exposed to a variety of diseases or infections such as lung cancer, bladder cancer, esophageal cancer, nasopharyngeal cancer, oral dysplasia, low-birth weight, herpes or tuberculosis [9-11].

A Systematic review by Akl *et al*. [12] had identified Shisha smoking as having significant risk factors particularly for lung cancer (Odds ratio [OR] = 2.12; 95% confidence interval [CI] = 1.32-3.42); respiratory illness (OR = 2.3, 95% CI = 1.1-5.1), low birth weight (OR = 2.12, 95% CI = 1.08-4.18).

It is believed that educational exposure of the health risks on Shisha smokers can have the effect of reducing the frequency of smoking Shisha [13]. However, an early exposure to the health risks among non-Shisha smokers is a useful prevention method to avoid them from participating in Shisha smoking in the future [14]. Abughosh *et al*. [15] found that the perception on the harmfulness itself might affect whether or not someone will continue to engage in the habit of smoking. Hence, developing early interventions is crucial to prevent an individual from starting the habit of smoking as it will benefit the non-shisha smoker who is yet to try smoking Shisha. Furthermore, it will also provide immediate protection for them in public areas [16]. Therefore, researchers believe that improving the knowledge on Shisha and non-Shisha smoker groups can indirectly contribute to the control of the Shisha smoking from spreading widely locally. Although extensive work on Shisha smoking had been done, only little attention had been focused on the intervention methods to improve knowledge on the health risks posed [14]. In this study, researchers have attempted to examine the differences in the role of information compact disk (CD) and pamphlet in improving the knowledge on the health risks among Shisha smokers and non-Shisha smokers.

METHODS

Research Design

The research was conducted using an experimental design. A convenient sampling of 40 Shisha smokers and 40 non-Shisha smokers from a private medical college located at Ipoh, Perak, Malaysia formed the sample for this study. This sample size was chosen based on the recommendation proposed by Gay [17] as a minimum sample size for a pre-post experimental study. The inclusion criterion for this study is: Those who reported of smoking Shisha and cigarette at least 1 day in the past 30 days. A student who had never tried Shisha but at least smoked cigarette at least 1 day in the past 30 days was considered a non-Shisha smoker in this study [18]. The exclusion criterion is: A student who is not a cigarette smoker and cigarrete smoker. Shisha group and non-Shisha group were included in this study because researcher believes that the improvement in the knowledge on Shisha and Non-Shisha smokers groups can indirectly contribute to the control of Shisha smoking from spreading locally. All the instrumentations of this study were presented and evaluated by the University Research Committee prior to the data collection process. The researchers obtained verbal, informed consent from the respondents who were willing to participate in the study. They were promised that the information obtained from them would be kept strictly private and confidential. All the selected respondents were then randomly assigned to the relevant experimental group and control group [Figure 1].

Instrument

The experimental group was given the information CD, whereas the control group the information pamphlet. In order to control the validity of the information given to all the respondents, the information CD and pamphlet were developed based on the findings from the review of the literature related to the health risks of smoking Shisha [9-11]. The content of the CD and pamphlet included:

i. Background to Shisha smoking,
ii. Category of Shisha smokers,
iii. The danger of Shisha smoking compared to cigarette smoking and,
iv. Exposure of the shisha smoker to 12 health risks.

To maximize the comprehensibility of the information, the organization of the information in CD and pamphlet followed the basic guide in writing educational materials [19]. The knowledge about the health risks of Shisha smoking was measured before and after the intervention using a self-constructed questionnaire. The questionnaire consisted of two parts. Part A included questions on basic demographic data such as gender, age, smoking status, age on starting Shisha smoking, partners of the smoker, sharing of Shisha and place for smoking Shisha. The status of smokers was established in accordance with Salameh *et al*. [20]. Mild smokers smoke three pipes or less per week; moderate smokers smoke three to six pipes per week, and heavy smokers smoke more than six pipes per week. Part B included items which assessed the respondent's knowledge of the health risks on Shisha smoking. The knowledge test was a 12-true-false test constructed based on the information contained in the CD and pamphlet provided. All the test items were weighted equally. While the answer "Yes" was given one mark, the answer "No" was given zero mark. The total marks awarded were 12.

Analysis

A pilot study was conducted among 20 respondents who did not participate in the actual study. The pilot test respondents were asked to comment on the information based on the CD

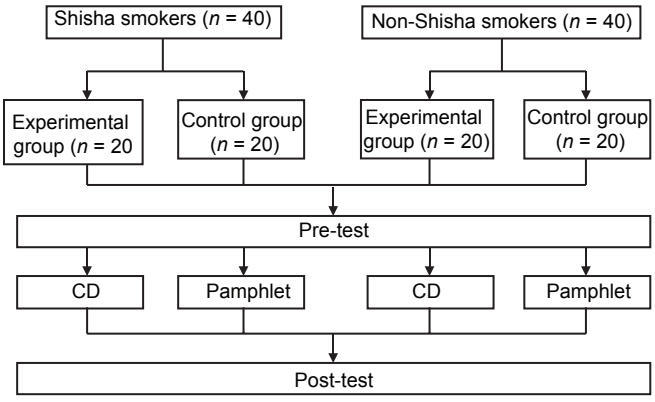

Figure 1: Research design

and pamphlet, and answer the questionnaire accordingly. The feedback from the pilot study revealed that the content provided in the CD and pamphlet was easy to understand. Pearson Product Moment correlation coefficient (r) was found to be 0.869, indicating the instrument had high test-retest reliability [17]. In the actual study, pre-questionnaire was distributed among all the respondents, followed with the distribution of information CD or information pamphlet to the respective groups. After 2 weeks, a post-questionnaire was distributed and collected on the same respondents. To reduce the threat of treatment bias, a 2-week interval time between pre-test and post-test was applied [21]. Independent T-test and dependent T-test were carried out to determine if there existed any difference in the knowledge between the experimental and control groups using the Statistical Package for Social Science software version 11.0 (SPSS Inc., Chicago, IL).

RESULTS

Demographic Information

The majority of the respondents in this study were males. Most of the female students who attended the college on the day of data collection declined to participate because they did not want to give out any information and were unwilling to be recorded too. The respondents' average age was 20.35 ± 1.49 years for non-Shisha group and 20.45 ± 1.43 years for Shisha group. Most of the respondents are mild smokers, that is, they smoke three pipes or less per week. The mean age of the respondents when they started smoking Shisha was 17.88 ± 1.68 years. Their favorite place to smoke Shisha is a care, and they habitually shared Shisha [Table 1].

Health Risk Knowledge of Shisha Smoking Before Intervention

An independent T-test was conducted to determine if the two groups of participants were equivalent in their knowledge about the health effects of Shisha smoking. The pre-test results of Shisha smoker group showed that the total means score of the experimental group is 5.35 ± 3.71 and control group is 5.05 ± 3.87 [Table 2]. The pre-test scores showed no significant differences (df = 38, t = 0.25, 2-tailed = 0.80) [Table 3].

On the other hand, the pre-test result of non-Shisha group between experimental groups is 7.90 ± 1.86 and control group is 7.40 ± 1.66 [Table 2]. These results showed that both groups were not significantly different (df = 38, t = 0.89, P = 0.37) [Table 3] in terms of their knowledge level. This result indicated

Table 1: Respondents' demographic characteristics

Characteristics	Non-Shisha smokers			Shisha smokers		
	Intervention *n* (%)	Control *n* (%)	*P* value	Intervention *n* (%)	Control *n* (%)	*P* value
Gender						
Male	18 (90.0)	16 (80.0)	0.40	17 (42.5)	18 (85.0)	0.42
Female	2 (10.0)	4 (20.0)		3 (7.5)	2 (15.0)	
Age						
18	0 (0.0)	4 (20.0)	0.003	5 (25.0)	1 (5.0)	0.045
19	1 (5.0)	3 (15.0)		3 (15.0)	1 (5.0)	
20	9 (45.0)	6 (30.0)		5 (25.0)	7 (35.0)	
21	3 (15.0)	6 (30.0)		6 (30.0)	4 (20.0)	
22	3 (15.0)	1 (5.0)		1 (5.0)	4 (20.0)	
23	3 (15.0)	0 (0.0)		0 (0.0)	2 (10.0)	
24	1 (5.0)	0 (0.0)		0 (0.0)	1 (5.0)	
Smoking status						
Three pipes or less per week	-	-	-	18 (90.0)	17 (85.0)	0.201
Three to six pipes per week	-	-		2 (10.0)	3 (15.0)	
More than six pipes per week	-	-		0 (0.0)	0 (0.0)	
Age started to smoke Shisha						
14	-	-	-	1 (5.0)	0 (0.0)	0.378
15	-	-		1 (5.0)	2 (10.0)	
16	-	-		1 (5.0)	2 (10.0)	
17	-	-		3 (15.0)	7 (15.0)	
18	-	-		5 (25.0)	3 (20.0)	
19	-	-		4 (20.0)	4 (5.0)	
20	-	-		4 (20.0)	1 (5.0)	
21	-	-		1 (5.0)	1 (5.0)	
Sharing water pipe						
Yes	-	-	-	19 (95.0)	19 (95.0)	0.162
No	-	-		1 (5.0)	1 (5.0)	
Place to smoke shisha						
Café/restaurant	-	-	-	10 (50.0)	16 (80.0)	0.065
Home	-	-		5 (25.0)	2 (10.0)	
Friend's house	-	-		1 (5.0)	2 (10.0)	
Other	-	-		4 (20.0)	0 (0.0)	

-: Not applicable

that knowledge of the respondents on the health effect before intervention was the same.

Health Risk Knowledge of Shisha Smoking Among Shisha Smokers After Intervention

From Tables 4 and 5, it can be noticed that 2 weeks after distributing the information CD and information pamphlet, Shisha smokers' knowledge in the experimental group had significantly improved (df = 19, t = 7.93, 2-tailed = 0.00) from 5.35 ± 3.71 to 11.85 ± 0.36. A similar pattern was observed in the control group, which showed significant improvement (df = 19, t = 5.54, 2-tailed = 0.000) from 5.05 ± 3.87 to 9.90 ± 3.00.

However, compared with the control group, the experimental group demonstrated significantly better understanding of health effects of Shisha smoking (df = 38, t = 2.87, 2-tailed = 0.007). This result indicated that the use of CD was more effective in improving the knowledge compared with the pamphlet among Shisha smokers [Tables 6 and 7].

Health Risk of Shisha Knowledge Among Non-Shisha Smokers After Intervention

From Tables 8 and 9, it can be noticed that non-shisha respondents' knowledge showed significant improvement, both in the experimental group (df = 19, t = 10.77, 2-tailed = 0.00) and the control group (df = 19, t = 5.67, 2-tailed = 0.00). For the experimental group, knowledge on the health risks had increased from 7.90 ± 1.86 to 11.25 ± 1.16. As for the control group, knowledge on the health risks had increased from 7.40 ± 1.67 to 11.25 ± 1.25.

For the non-Shisha smoker, unlike the Shisha smoker group, the CD and pamphlet method did not play a significant role in improving the knowledge of health effects of Shisha smoking (df = 38, t = 0.00, 2-tailed = 1.00) [Tables 10 and 11]. In others words, both the CD and pamphlet had the same effect of improving non-Shisha respondents' knowledge.

Comparison of Health Risk Knowledge Among Respondents

According to Table 12, knowledge about the 12 health risks for Shisha group had increased after the intervention. However, for the non-Shisha smokers, knowledge only on a few health risk aspects namely periodontal cancer, tuberculosis, low birth weight, newborn pulmonary problem, nasopharyngeal cancer, oral dysplasia, gastric cancer and hepatitis C had improved significantly.

DISCUSSION

Though the majority of the respondents in this study were males, these researchers believe that gender factor may not affect the finding of the study after all simply because it was not a significant predictor of the use of Shisha [14]. The mean age of initiation of Shisha smoking in this study is 17.88 ± 1.43; this is similar to the study done by Poyrazoglu

Table 2: Descriptive statistics of pre-test for Shisha and non-Shisha group

Category	Group	*N*	Mean	Standard deviation	Standard error mean
Shisha	Experimental group (CD group)	20	5.35	3.71	0.373
	Contol group (pamphlet group)	20	5.05	3.87	0.416
Non-Shisha	Experimental group (CD group)	20	7.90	1.86	0.865
	Control group (pamphlet group)	20	7.40	1.66	0.831

CD: Compact disk

Table 4: Descriptive statistics for pre-test and post-test Shisha group

Group	Test	Mean score	*N*	Standard deviation	Standard error mean
Experimental group (CD group)	Pre-test	5.35	20	3.71	0.83
	Post-test	11.85	20	0.36	0.82
Control group (Pamphlet group)	Pre-test	5.05	20	3.87	0.86
	Post-test	9.90	20	3.00	0.67

CD: Compact disk

Table 5: Paired sample test for pre- and post-test Shisha group

Group	Mean	Standard deviation	Standard error mean	*t*	df	Significant (2-tailed)
Experimental group (CD group)	6.50	3.66	0.81	7.93	19	0.00
Control group (Pamphlet group)	4.85	3.91	0.87	5.54	19	0.00

CD: Compact disk

Table 6: Descriptive statistics of post-test for Shisha group

Category	Group	*N*	Mean	Standard deviation	Standard error mean
Shisha	CD group	20	11.85	0.36	0.08
	Pamphlet group	20	9.90	3.00	0.67

CD: Compact disk

Table 3: Independent T-test of pre-test for Shisha and non-Shisha group

Group	Variance	Levene's test for equality of variance		T-test for equality of mean				Standard error difference
		F	Significant	*t*	df	Significant (2-tailed)	Mean difference	
Shisha	Equal variance assumed	0.80	0.37	0.25	38	0.80	0.30	1.20
	Equal variances not assumed			0.25	37.93	0.80	0.30	1.20
Non-Shisha	Equal variance assumed	0.76	0.38	0.89	38	0.37	50	0.55
	Equal variances not assumed			0.89	37.54	0.37	50	0.55

Table 7: Independent T-test of post-test for Shisha group

Group	Variance	Levene's test for equality of variance		T-test for equality of mean				Standard error difference
		F	Significant	*t*	df	Significant (2-tailed)	Mean difference	
Shisha	Equal variance assumed	61.75	0.00	2.87	38	0.007	1.95	0.67
	Equal variances not assumed			2.87	19.56	0.009	1.95	0.67

et al. [4] and Taha *et al*. [5] which involved respondents among university students. But this initiation age is much earlier compared to the studies involving the general public [6,22]. This finding strengthens the point that the culture of Shisha smoking has its roots in the formal schooling years and is popularized through student culture [23]. Abughosh *et al*. [15] findings further supported this study and found that the habit of Shisha smoking can be initiated by all types of students, particularly by high-achieving students. Most of the respondents were mild smokers: They smoked three pipes or less per week. This showed that the respondents did not show any sign of nicotine dependence. It is also possible that as future healthcare providers, they controlled their habit and do not see themselves as addicts and feel that they can quit whenever they want. Nineteen respondents from the 20 chose a café as their most favorite place to smoke Shisha. This is similar with most of the previous findings, where, a café is considered a place for relaxing with friends [1]. This point is supported by the spreading of a large number of restaurants serving Shisha in Ipoh [6]. However, smoking at a café consequently produced another health problem for the respondents, that is, it increases the rate or possibility of tuberculosis due to the sharing of the mouthpiece [11,22]. Studies showed that there is a higher rate of tuberculosis among Shisha smokers in comparison to the cigarette smokers. It is hoped that the information on the health risks provided in this study can alert current respondents in not sharing the mouthpiece in future. In addition, it had also been shown that students are more exposed to the inhalation of toxic materials in tobacco when smoking Shisha. In terms of the respondents' knowledge about the health risks of Shisha, all the respondents scored low on the knowledge items. This indicated that they were in lack of knowledge on this aspect. This finding is inconsistent with the previous studies done among university students [2,5]. Unlike the study done by Poyrazoglu *et al*. [4], majority of those of do not smoke Shisha had no clue about the harmful effects of Shisha, while most Shisha smokers perceived that Shisha was harmful to them and the environment. This showed the urgency on the need for educational support about health risks of Shisha smoking. The knowledge scores increased for Shisha and non-Shisha smokers after they had received the pamphlet. This finding indirectly showed that any printed material, such as the pamphlet, is still effective as a mode of communication in public health education even with the advent of modern technology. Therefore, it should be continued to be used by the health care community. Interestingly findings in this study also showed that the information CD used in this study is more effective compared to the pamphlet-based information for the Shisha smokers. This result could be attributed to the fact that current Shisha smokers are better at pretending to know the danger of smoking teenagers compared to non-Shisha smokers. Therefore, more attractive educational materials such as the CD will be more effective in raising their attention than conventional printed materials. Unlike the non-Shisha smoking group both methods are effective in delivering the knowledge on the health risks among non-Shisha smokers. According to Sabahy *et al*. [14], those who never smoked Shisha before had more positive attitudes towards the harms, addictiveness and social obscenity of smoking Shisha, and as a result, they were more easily able to accept any information given regardless of the methods of delivery. Further studies in this area should be conducted to confirm this idea. In terms of knowledge improvement after the intervention, findings showed that knowledge on almost all aspects of the health risks increased after intervention among Shisha users. However, for non-Shisha smokers, eight health risk aspects, namely periodontal cancer, tuberculosis, low birth weight, newborn pulmonary problem, nasopharngeal cancer, oral dysplasia, gastric cancer and hepatitis C improved significantly. This is mainly due to the fact that all of these diseases are not generally known to the public. In addition,

Table 8: Descriptive statistics for pre-test and post-test non-Shisha group

Group	Test	Mean score	*N*	Standard deviation	Standard error mean
Experimental group (CD group)	Pre-test	7.90	20	1.861	0.416
	Post-test	11.25	20	1.164	0.260
Contol group (Pamphlet group)	Pre-test	7.40	20	1.667	0.373
	Post-test	11.25	20	1.251	0.280

CD: Compact disk

Table 9: Paired sample test for pre-test and post-test non-Shisha group

Group	Levene's test for equality of variance		T-test for equality of mean			Significant
	Mean	Standard deviation	Standard error mean	*t*	df	
Experimental group (CD group)	3.85	1.59	0.36	10.77	19	0.00
Contol group (Pamphlet group)	3.35	2.64	0.59	5.67	19	0.00

CD: Compact disk

Table 10: Descriptive statistics of post-test for non-Shisha group

Category	Group	*N*	Mean	Standard deviation	Standard error mean
Non-Shisha	Experimental group (CD group)	20	11.25	1.16	0.26
	Control group (pamphlet group)	20	11.25	1.25	0.28

CD: Compact disk

Table 11: Independent T-test of post-test for non-Shisha group

Group	Variance	Levene's test for equality of variance		T-test for equality of mean				Standard error difference
		F	Significant	*t*	df	Significant (2-taziled)	Mean difference	
Non-Shisha	Equal variance assumed	0.10	0.74	0.00	38	1.00	0.00	0.38
	Equal variances not assumed			0.00	37.80	1.00	0.00	0.38

Table 12: Health risk knowledge

Health risks	Shisha smokers						Non-Shisha smokers					
	Control			Experiment			Control			Experiment		
	Pre-test	Post-test	*P* value	Pre-test	Post-test	*P*-value	Pre-test	Post-test	*P* value	Pre-test	Post-test	*P* value
Asthma	65	85	0.104	75	100	0.02**	75	95	0.10	90	100	0.16
Oesophageal cancer	60	95	0.01*	60	95	0.01**	80	95	0.08	90	95	0.33
Bladder cancer	55	85	0.03*	75	100	0.02**	65	100	0.01**	75	100	0.02
Lung cancer	40	90	0.00**	55	100	0.00**	75	95	0.10	85	95	0.16
Periodontal cancer	45	85	0.01**	50	100	0.00**	65	95	0.03*	70	100	0.01*
Tuberculosis	45	95	0.00**	50	100	0.00**	75	100	0.02*	75	100	0.02*
Low birth weight	45	75	0.08	40	95	0.00**	70	95	0.06	75	100	0.02*
Newborn pulmonary problem	40	75	0.01*	25	100	0.00**	60	100	0.01*	50	100	0.00**
Nasopharngeal cancer	35	80	0.00**	30	100	0.00**	60	95	0.06	30	95	0.00**
Oral dysplasia	35	65	0.06	30	95	0.00**	45	90	0.00**	35	85	0.00**
Gastric cancer	25	85	0.00**	20	80	0.00**	60	70	0.54	35	70	0.05*
Hepatitis C	30	75	0.00**	30	100	0.00**	60	100	0.02**	30	85	0.00**

*Significant at $P<0.05$, **Significant at $P<0.01$

these diseases are not commonly known to be related to the diseases for smokers.

CONCLUSION

Both the information CD and pamphlet approach developed for this study had succeeded in improving the knowledge among Shisha and non-Shisha smokers on the major health risks of smoking Shisha. However, the information CD is more effective than the information pamphlets in improving the knowledge among Shisha smokers. While improving the knowledge on the health risks might affect the non-smokers in the initial decision to engage in Shisha smoking, improving the knowledge on the overall harms done could be influential in the final decision to continue the habit among them. Therefore, in future, the Ministry of Health should focus more on developing more technology-based information rather than focusing only on the use of pamphlets when promoting health programs. This is specifically important to the computer-savvy younger generation.

Limitation

This study has some limitations. This study was based on a convenient sampling. Thus, the results of the study were unable to examine the non-participants. Furthermore, the findings may be limited to this particular university student and other geographical areas in Malaysia may not be similar.

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