Tobaccofree Campus Initiative: A Quitting Strategy for Kuwait Nursing College Student Smokers

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Abstract

Background: Smoking cessation involves changing of unhealthy smoking habit which accounts for 63% of global deaths. This study was in response to the United Nations General Assembly Global Forum for Non-communicable Disease's invitation to nurse researchers to evaluate smoking cessation interventions for their students. **Objective:** To evaluate "Tobaccofree campus initiative" combined with tobacco cessation interventions as quitting model for student nurses. **Methods:** This was the second part of a multi-phase study which involved a series of 'No- smoking' campaigns, enforced tobaccofree campus initiative, mandatory weekly monitoring of biological health indicators and biochemical feedback using expiratory carbon monoxide (CO) levels for 36 real cigarette and shisha smokers. The quasi-experiment lasted 10 weeks. Participants' data on tobacco use, quit attempts and self-efficacy (SE) were collected using a 25- item bi-lingual questionnaire. Counseling and smoking cessation aids for their choice were offered. **Results:** All the participants lived with their families and 70% of the families smoked cigarette and/or shisha. Previous quit attempts were statistically higher in males than females, 47.2% versus 13.9 % and (U=76.00, P= 0.007). High SE to quit was 36% and the quit rate for the last 4 weeks was 13.9%. Biological health indicators of participants such as pulse rate and systolic blood pressure improved as a result of cessation interventions. **Conclusion:** CO monitoring followed by counseling were effective smoking cessation interventions.

Keywords: Tobaccofree campus, Quitting strategies for nursing students, Carbon monoxide monitoring, Self-efficacy.

Introduction

Smoking cessation involves changing old unhealthy tobacco smoking habit which is said to be a major contributor in developing non-communicable diseases (NCDs) that accounts for 63% of global deaths (Human Resources for Health Observers, 2012). The global forum for NCDs invited nurse researchers to conduct studies on the prevalence of tobacco use among its professionals and students and evaluate tobacco cessation programs (Human Resources for Health Observers, 2012). For decades both health professionals and tobacco industries have provided anti-smoking information which has not guaranteed smoking cessation. Most adult smokers are aware of the dangers of smoking tobacco products and yet they resist quitting or relapse.

Review of Literature

Prevalence of smoking tobacco products is high among youths and adults in Kuwait society (Memon et al., 2000; WHO, CDC, 2010; Gaafar & Basiony, 2013) and also among the nursing students as shown in the first part of this study: The Prevalence of Tobacco Products Use among Kuwait Nursing College Students. Non-communicable diseases (NCDs) attributed to tobacco smoking includes: cardiovascular diseases, chronic respiratory diseases and cancers (Human Resources for Health Observers, 2012).

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Surgeon General's report 2010 on how tobacco smoke causes cardiovascular disease, explained that when tobacco is inhaled, the toxins circulate from the lungs to the circulatory system. There, they altered the blood chemistry, leading to increase levels of triglycerides, build-up of plaques in the arteries, thickening and narrowing of arteries resulting in increased heart rate and blood pressure. The clots and dislodged plaques can block blood vessels causing chest pain, heart attack or stroke. Chronic respiratory diseases result from tobacco smoke damaging the cilia lining the air ways. With time the damage to the cilia prevents their protective mechanism leading to coughing, wheezing, shortness of breath (SOB) and damaged lung tissues which eventually leads to chronic respiratory diseases. Cancers develop from tobacco toxins damaging DNA of cells (CDC, 2010). A study conducted in Kuwait attributed the failure of most smoking cessation programs to negligence of investigators to include self-efficacy (SE) as an important predictor and motivator for quitting smoking (Badr & Moody, 2005).

SE is understood by many as the belief that a person has, regarding his/her confidence to succeed in achieving a desired outcome (Bandura, 1977). The study investigated SE as a predictor for smoking cessation in 657 adult Kuwaitis working in six ministries in Kuwait. Their sample was divided into two groups: contemplators who were individuals who planned to quit smoking in the next six months and pre-contemplators, who did not have quitting plans. Their result revealed that 61.3% of the participants were contemplators and 260 (64.5%) of them have had 1-5 unsuccessful quit attempts a year prior to the study. However, Self-efficacy was found to be the first predictor for smoking cessation among contemplators. Self-image was also the only other factor that was found to be significantly different between contemplators and pre-contemplators. Low self-image accounted for smokers who did not attempt to quit. Socio-economic status and stressful situations were other confounding variables that increased relapse rate (Badr & Moody, 2005). Their study failed to recommend any smoking cessation program to assist Kuwaiti smokers in quitting and preventing relapse.

Meta-analytic reports of 42 and 49 randomized trials of smoking cessation interventions by nurses and health visitors, with a minimum of six months follow-up, conducted in 2009 and 2013 respectively, showed reasonable evidence that smoking cessation advice and/ or counseling given by nurses were effective (Rice et al., 2009 & 2013). United Kingdom smoking cessation guidelines for health professionals reported favorable quitting outcomes when smokers used non-nicotine prescribed medications and/ or Nicotine Replacement Therapy (NRT). NRT reduces motivation to smoke and ease the transition from tobacco use to complete abstinence, by reducing nicotine withdrawal symptoms (Stead et al., 2008). NRT products such as nicotine gum, transdermal patch, nasal spray, inhalator and sublingual tablets, have been recommended in clinical guidelines as first line treatment for smokers who need pharmacological assistance (Stead et al., 2008). NRT when used with counseling is said to improve quit rates (West et al., 2013). The English stop smoking services on its 10th year anniversary, recorded a quit rate of about 35% without relapse 4 weeks after quitting (West et al., 2013). Their strategy included counseling with or without NRT or non-nicotine pharmacotherapy / prescribed medications.

According to a tobacco cessation clinician, smoking cessation should involve motivating the nicotine addicts to accept to quit and receive support from health care workers, family, friends and associates (Hughes, 2003). Quitting may happen abruptly without intervention, just by the smoker's will power (cold turkey) or, it may occur as a result of gradual process of cutting down in the amount of tobacco products resulting in reduction in nicotine intake until they achieve sustained abstinence with or without smoking cessation aids. In the latter case, they may require to be encouraged to make several attempts whenever they relapse (Hughes, 2003).

The clinical practice guideline for United States Public Health Services (USPHS) intervention is based on the concept of 5As /5Rs. 5As involve "Ask about tobacco use", "Advice to quit", Assess willingness to make a quit attempt", "Assist with treatments"   and "Arrange follow-ups". Some studies have reported the effectiveness of this strategy in promoting quitting and preventing relapse (Fiore et al., 2008). Some health practitioners who are not trained to provide pharmacotherapy / prescription medications are advised to use the modified version (AAR): Ask about smoking habit, Advice smokers to quit and Refer smoking clients that need assistance to smoking cessation clinics (Berndt et al., 2011). The practice guide also provided action plan for the smoker not ready to quit. The clinician should proceed to brief motivational interview using the5Rs: "Focus on the client's personally Relevant information", "Risks of smoking", "Rewards of stopping", "Roadblocks to quitting" and "Repeat the advice" (Fiore et al., 2008).

As laudable as these behavioral interventions may seem, it appears that many smokers never successfully quit because of the challenges of relapse. Relapse is when a smoker resumes smoking after quitting. There are reports on the role of psychosocial skills vis-à-vis encouraging quitting and resisting relapse. They include smokers engaging in behaviors incompatible with tobacco use such as sports / exercise, social support individuals or groups including nicotine anonymous, telephone and email support, Tobacco Harm Reduction (THR) Therapy, acupuncture and hypnosis. There is no evidence base study yet reporting the effectiveness of acupuncture and hypnosis (treatobacco.net, 2013).

Monitoring and Identification of Smokers

Two types of biochemical feedbacks have been reported as means of identifying and monitoring tobacco users. They are also used to provide motivation to quit by providing objective data on the individual's smoking status. The first type is breath expiratory carbon monoxide (CO) monitoring. This is a non-invasive method of blowing into the device which records the amount of CO in the blood (Bittoun, 2008; Irving et al., 1988). The second biochemical feedback which can be invasive involves measuring the amount of cotinine in a sample of blood, urine, saliva or hair (Florescu et al., 2009).

Theoretical Frame work

There are many theories applicable to tobacco cessation studies including Bandura's Social learning theory, which involves self-efficacy (Bandura, 1977) and the locust of control theory which proposes that the behavior of an individual is dependent upon the individual's beliefs regarding both the value of the outcome and the perceived probability of that particular outcome occurring (Holloway & Watson, 2002). However, the authors' choice of an all-embracing theoretical framework to under pin this study to be Prochaka's Transtheoretical Model (TTM) of behavior change. This theory consists of four major constructs: stages of change, process of change, decision balance and self-efficacy (Rankin et al., 2005). The stages of Prochaska's TTM of change behavior are: Pre-contemplation stage, when the individual is unaware that his/her behavior is problematic and is not ready to take any action in the next 6 months. The next stage is contemplation stage, where the individual is beginning to recognize that his/her behavior is problematic and he/she is contemplating on doing something about it. The preparation stage is when the individual is ready to take small steps towards behavior change. In the Action stage the individual makes specific overt modifications to acquire the new healthy behavior and in the maintenance stage, the individual is able to sustain the action for 6 months without relapse. The next stage is either termination stages where there is zero temptation to return to the unhealthy habit or relapse when the individual returns to earlier stages (Rankin et al., 2005).

Materials &Method

This is the second part of a multi-phases study. The first phase was a cross sectional survey which provided data on the prevalence of tobacco product use among the students attending the college of nursing, Kuwait. The findings are being reported in a separate paper. This second phase was to evaluate models of tobacco cessation strategies used in CON Kuwait. It was initiated by organizing a series of 'Tobacco Free Campus / No-Smoking' campaigns, using banners, role-plays, and distributing health education leaflets on health hazards of tobacco. All the staff and students in the college were invited for non-invasive carbon-monoxide (CO) testing using Pico Simple Smokerlyzer. Smoking ban was then enforced by college authority using security staff because it became apparent that non-smokers in the boys' section were having CO levels of 4-6 ppm despite their smoke free home environments.

During the campaigns, active smokers who were motivated to quit and needing assistance were invited to enroll in the study. Fifty real life cigarette and shisha smokers enrolled to participate in the quasi-experiment. They completed a 25 item bilingual (Arabic and English) self-administered questionnaire to obtain their socio-demographic characteristics, baseline data, their tobacco use and previous unsuccessful quit attempts. Content validity was done by smoke cessation expert and her suggestions were in-cooperated into the questionnaire. Participants chose members of the research team they felt comfortable with, for weekly counseling and mandatory monitoring of biological health indicators. Subjective data were obtained by asking them if they experienced episodes of productive or non-productive cough, wheezing, shortness of breath (SOB) and chest pain. Objective data were obtained by measuring their blood pressure, pulse rate, respiratory rate, percentage of oxygen saturation and expiratory carbon monoxide

(CO) level using Pico Simple Smokerlyzer. They were also asked the last date they indulged in smoking tobacco products. All the participants had counseling to encourage them in their quit attempts and to remain on the study for a period of 10 weeks.

In addition to counseling they were allowed to select any smoking cessation aid of their choice, which included abstinence / will power, nicotine free shisha pen, electronic nicotine free shisha pipe, E-cigarette and three different types of NRT (gum, patch and lozenges).

Inclusion criteria

All student nurses who are active/current cigarette and or shisha smokers and who are willing and are motivated to try and quit.

Ethical consideration

The study was approved by nursing department ethical research committee and the college of nursing ethical research committee. All the participants signed informed written consent and were told participation was voluntary and they could discontinue whenever they felt like. Of the 50 (35 boys and 15 girls) that enrolled for the study only 36 (23 boys and 13 girls) remained for the entire period of 10 weeks. The attrition rate was 38.9%.

Data analysis

Commercial software Statistical package for Social Sciences (SPSS) version 22.0 for windows was used to analyze the data. Both descriptive and inferential statistics were utilized. Frequencies, percentages and cross tabulation were used to measure the study variables. Inferential statistics was by using both parametric test: Pearson correlation and non-parametric tests: Pearson chi-square, Kruskal-Wallis and Mann-Whitney U tests.

Result

Cronbach's alpha coefficient for the questionnaire was 0.745.

The demographic characteristics of the participants

Twenty three males (63.9%) and 13 females (36.1%) participated in the study. Their age distribution was: 19 (51.4%) aged 17-20 years, 15 (40.5%) aged 21-24 years and only 2 (5.4%) were 25 years and older. Only one male participant was married the remaining participants were single. The participants were from 11 nationalities: 8 Syrians, 8 Non-Kuwaitis, 6 Jordanians, 3 Iranians, 2 Kuwaitis, 2 Somalis, 2 Lebanese, 2 Palestinians, 1 Egyptian,1 Yemeni and 1 Eritrean. All the participants were residing with either their nuclear or extended families at the time of the study. Twenty three (63.9%) said their family members used tobacco products, while 13 (36.1%) said their family members did not use tobacco products.

History of tobacco-product use

Thirteen participants (36%), 11 males and 2 females said they only smoked cigarette. The 2 females smoking history was 6-10years and an average of 12-15 sticks per day. The 11 males cigarette smoking history varied from 2 weeks to 15 years and the number of cigarette they smoked per day varied from 1-30 sticks. The result of Mann-Whitney-U test for cigarette smoking between males and females suggest that there is statistically significant difference in number of years they have been smoking cigarette between the males and the females ($U = 74.500$, $p = .010$), concluding that the duration of males cigarette smoking are statistically significantly higher than for the females. Also, there was statistically significant difference in the "No of cigarettes per day" between the males and the females ($U = 61.000$, $p = .002$), concluding that the "No of cigarettes per day" for males were statistically significantly higher than the "No of cigarettes per day" for females. .There was also statistically significant difference in the amount of money spent on cigarettes per week between the males and the females ($U = 48.500$, $p = .001$), concluding that males spent more money on cigarette than females.

Ten (27.8%) of the 15 (40.5%) participants who smoked shisha were females and the duration of their shisha smoking varied from 1-9 years. They claimed they smoked from 1 to 9 heads of shisha per day. Smoking of one head of shisha lasts approximately one hour. Five males smoked only shisha and the duration of smoking shisha varied from 1-4 years, and 1-10 heads per week. The duration of shisha use of female and male was analyzed using Mann-

Whitney –U test. The results suggest that there is statistically significant difference, (U = 88.500, p = .037), concluding that the duration of smoking shisha for females are statistically significantly higher than duration of smoking shisha for males.

Kruskal-Wallis test was used to analyze if there was any significant differences in the distribution amongst nationalities. The results suggest that there is statistically significant difference amongst the underlying distributions of "For how many years have you been smoking cigarette" amongst the nationalities (χ^2 =18.982, df =9, p = .025).

One female and 7 male participant smoked both cigarette and shisha. The female had a history of shisha smoking of 9 heads per week for 5 years and 10 cigarettes daily for 3 years. The males had a history of shisha smoking of 1-8 hours weekly for 1-7 ½ years and 20-30 cigarettes for 1-8 years.

Quit History

All of the participants said they were motivated to try and quit during this study for health reasons. When asked the number of previous quit attempts, 21 (58%) said they have never tried to quit, 3 (8.3%) have tried to quit once, 5 (13.9%) attempted twice and 6 (16.7 %) had more than 3 unsuccessful quit attempts. Previous quit attempts were higher in male (47.2%) than female (13.9%). Mann-Whitney-U test results suggest that there is statistically significant difference in "How many times have you tried to quit using tobacco products" between the males and the females (U = 76.000, p = .007), concluding that the number of quit attempts for males are statistically significantly higher than for females. When asked about the unsuccessful quitting methods they used, 7 said they stopped buying tobacco products, 5 said, they gradually decreased their tobacco use, 6 said, they engaged in sports, 3 used nicotine gum, 1 used electronic cigar and the remaining 14 said they did not use any method.

Pre-quit self-efficacy

This was assessed by asking them if they believed they will quit at the end of 10 weeks. Table 1 below illustrates the characteristics of participants with high and low self-efficacy and their smoking cessation outcomes. Thirteen (36 %) of the participants, 9 males and 4 females believed, they can quit tobacco use at the end of 10 weeks. While the remaining 23 (64%) were not sure they can quit at the end of 10 weeks. Quit attempts were validated by level of CO and self-report date of last tobacco product use. At week 10, out of the 13 with strong level of perceived self-efficacy to quit, only 5 succeeded in quitting: one male, one month old, only 1 cigarette daily smoker quitted for the last4 weeks, while the other male cigarette only smoker for 1 year duration smoking 10 cigarettes daily quitted at the last 2 weeks. One male shisha only smoker of one and half years duration of smoking 4 heads weekly quitted at the last 4 weeks, and

Table 1: Comparison of characteristics of participants with high and low Self-efficacy and their smoking cessation outcomes

Variables	Participants with high self-efficacy		Participants with Low self-efficacy		Total
	N (13)	%	N (23)	%	36
Gender:					
Male	9	69.2	14	60.9	23
Female	4	30.8	9	39.1	13
Type of tobacco products:					
Cigarette only	6	46.2	7	30.4	13
Shisha only	4	30.8	11	47.8	15
Cigarette & Shisha	3	23	5	21.8	8
Family smoking status:					
Nonsmoking family	6	46.2	7	30.4	13
Smoking family	7	53.8	16	69.6	23
Previous quit attempts					
None	3	23.	10	43.5	13
Once	2	15.4	2	8.7	4
More than once	8	61.6	11	47.8	19
Current quit attempts:					

Abruptly	1	7.7	1	4.4	2
At week 6	2	15.4	0	0	2
At week 8	1	7.7	0	0	1
Using cessation aids	2	15.4	0	0	2
Cutting down on tobacco	2	15.4	3	13	5
No quit attempt(s)	5	38.4	19	82.6	24

1 new female shisha only smoker of 2 weeks duration quitted immediately and remained nicotine free for the rest of the 10 weeks. One female shisha smoker of 2 years duration, switched to smoking nicotine free organic shisha and her CO level remained normal (4ppm). Two male smokers who combined cigarette and shisha stopped shisha at the last 4 weeks but continued to smoke cigarette, one female cigarette smoker continued smoking E-cigarette and the CO levels of these last 3 participants were still high and therefore not classified as quitters. The remaining 5 were unable to quit although they self- reported reduction in their tobacco use and their CO levels were reduced but still abnormal.

Twenty three (64%) of the participants, had lower level of perceived self-efficacy and were not sure whether or not they can quit at the end of the 10 weeks. However, one female shisha smoker of 2 years duration quitted at the first week and remained nicotine free from her CO level of 2 ppm. One male combined user, stopped shisha but continued smoking cigarette, his CO level actually increased from 25 ppm to 30 ppm by week 10. One male and one female cigarette smokers reported that they were gradually weaning themselves of cigarette by smoking less sticks per day, the comparison of week 1 (pre-intervention) and week 10 (post intervention) CO levels showed a reduction from 24 ppm to 12 ppm and 24 ppm to 13 ppm respectively. The remaining participants maintained their smoking status quo with fluctuating but high CO levels. The quit rate for this study is therefore calculated as a total of 6 (16.7%). Chart 1 below shows weeks 1 (pre-intervention) CO level, week 5 & week 10 (post-intervention) CO levels. More participants attained normal CO levels in week 10, compared to their pre-intervention levels.

When asked of their opinion regarding the effectiveness of tobacco ban on campus, they all said, it will make no difference to them and will not make smokers quit.

When asked what can make them quit, majority of them: 13 (36%) said they needed the will power, 6 (16.7%) said they didn't know, 4 of the female participants said marriage and pregnancy will motivate them to quit other responses from the females included psychological comfort and sickness.

**Tobacco cessation interventions used in this study**

All participants had biological health indicators and CO level measured and recorded weekly. Face to face counseling either individually or a small group of friends were done by the researcher of their choice. They were shown the range of cessation aids and were asked to try any of their choice. Health education brochures and handouts in English and Arabic about hazards of cigarette, shisha and second hand tobacco, NRT were available for them to take away. Majority of the participants chose to quit on their own (cold turkey). Two female shisha smokers quitted abruptly and did not relapse throughout the study. They belonged to a small counseling group of 5 girls; however, they continued to attend their weekly monitoring and tried to encourage their friends to quit. Three of the 7 male participants that smoked both cigarette and shisha stopped smoking shisha and reported reduction in the no of cigarette they smoked, 2 of them had a drop in their CO levels from 42ppm in week 1 to 13ppm, 14 ppm to 4 ppm respectively. However, the third male participant who stopped shisha but continued to smoke 30 sticks of cigarette per week actually experienced an increase in his CO level from 25ppm in week 1 to 30ppm in weeks 5 and 10. The female participant that switched to E-cigarette had a drop of CO level from 30ppm in week 1 to 23ppm in week 10. One female and one male decided on gradual reduction of daily cigarettes of 15-20 cigarettes and their CO levels dropped from 24ppm to 13 & 12ppm respectively. The remaining participants self-reported decrease in the no of cigarette or shisha they smoked, but their CO levels did not show any significant decrease rather their CO levels continued to fluctuate ranging from 7 ppm to 37 ppm in week 10.

Health implications of the study

Pre-intervention health status of the participants were measured in week one of the study. Questions regarding participants' biological health indicators revealed that 10 (27.7%) reported that they were coughing, 5

(13.9%) were wheezing, 7 (19.4%) complained of shortness of breath and 2 (5.6%) complained of chest pain. Participants' pulse rate and blood pressure were measured with digital blood pressure monitor, two of the male participants with cough, wheezing, SOB and chest pain had increased blood pressure above 140 /90mm Hg and increased pulse rate (tachycardia) ranging from 100-113 beats per minute.

Chart 1: Pre-intervention pulse rate (week 1) & post-intervention pulse rate (week 10)
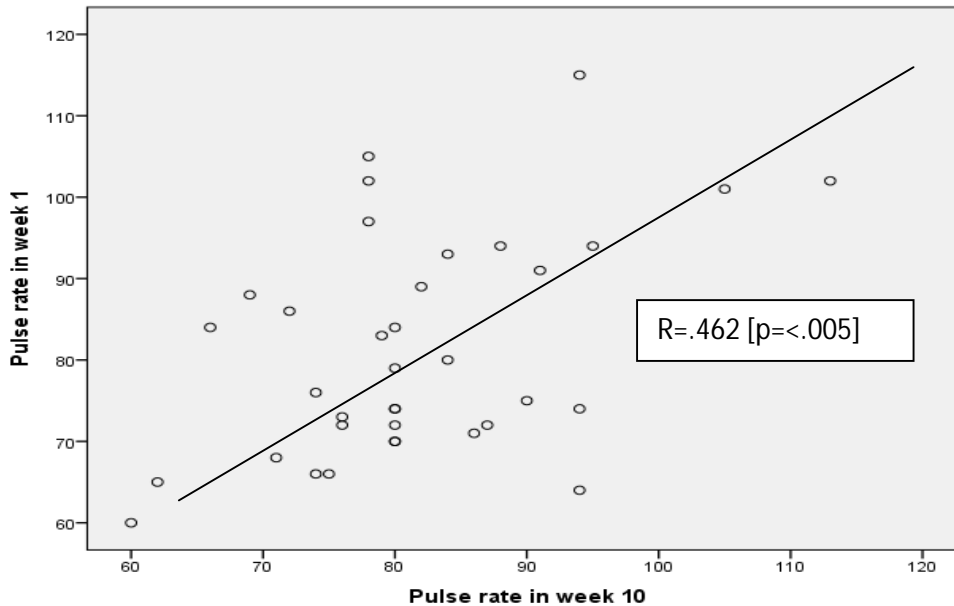
A scatter-graph (chart 1) above suggests that there maybe a positive correlation between week 1 and week 10 pulse rate. Pearson correlation between week 1 and week 10 pulse rate accounted for 94% of the variance. R (36) = 0.462, p= <0.005.

A scatter-graph (chart 2) below, suggests that there maybe a positive correlation between week 1 and week 10 systolic blood pressures. Pearson correlation between week 1 and week 10 pulse rate accounted for 94% of the variance. R (36) = 0.330, p= <0.049.

Chart 2: Pre-intervention systolic B/P (week 1) & Post intervention B/P (week 10)
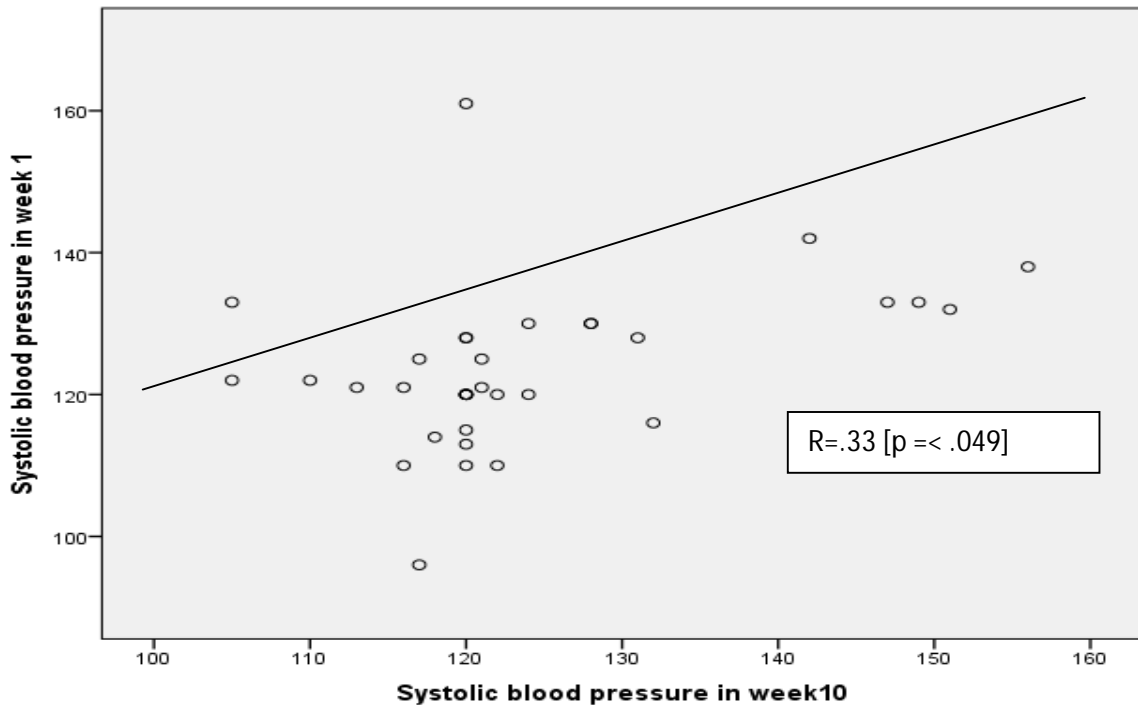
In chart 3, the scatter-graph showed no significant correlation observed in diastolic blood pressure in week 1 and 10, r(36)=0.149, p <.387.

Chart 3: Pre-interventional diastolic B/P (Week 1) & post-interventional diastolic B/P (week10)
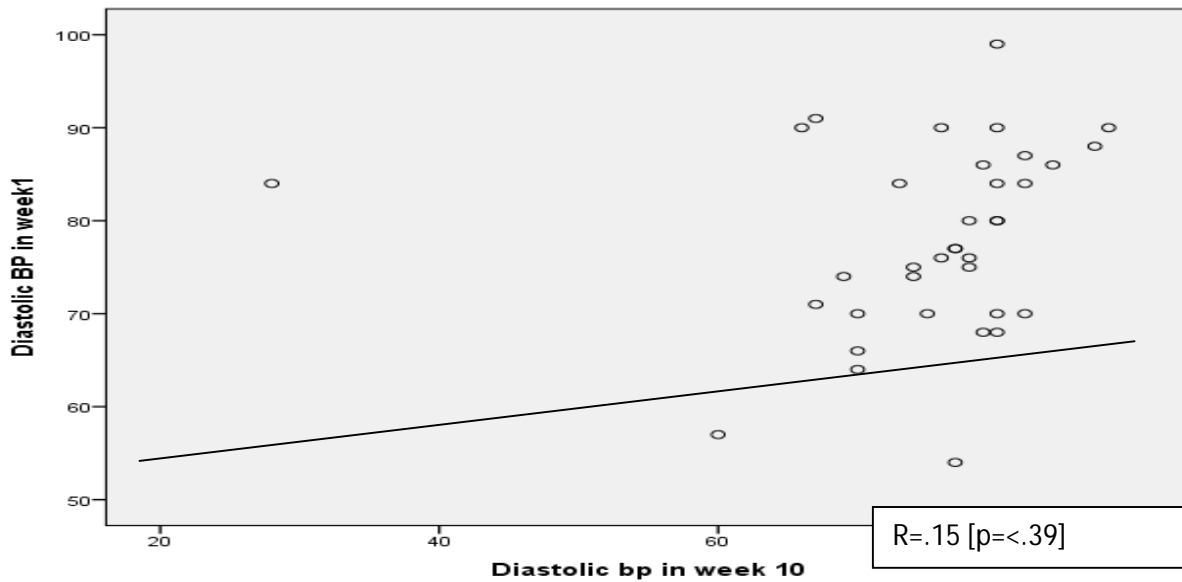
Oxygen saturation level was measured using finger pulse oximeter and the recordings were all within normal range of 96-99%. Their carbon monoxide (CO) levels showed that 11 of them had levels of 4-6ppm which are within normal range, 6 had CO levels 7-10 ppm indicating light smokers, 7 had CO levels 11-20 ppm indicating they are smokers and11 had CO levels of 20- 42ppm indicating they are heavy smokers. Kruskal-Wallis results suggest that there is statistically significant difference in CO level result in week 1& week 5 between the males and the females (U = 58.000, p = .003) &(U = 73.500, p = .012), respectively, which meant that   "CO result in weeks 1& 5 for males are

statistically significantly higher than that for females. After week 5 none of the participants reported experiencing any symptoms of cough, wheezing, SOB or chest pain. Week 10 results suggested that there was no statistically significant difference in the "CO result between the males and the females (U = 111.000, p = .203).

Chart 4: Comparison of Carbon Monoxide levels for weeks 1, 5 & 10
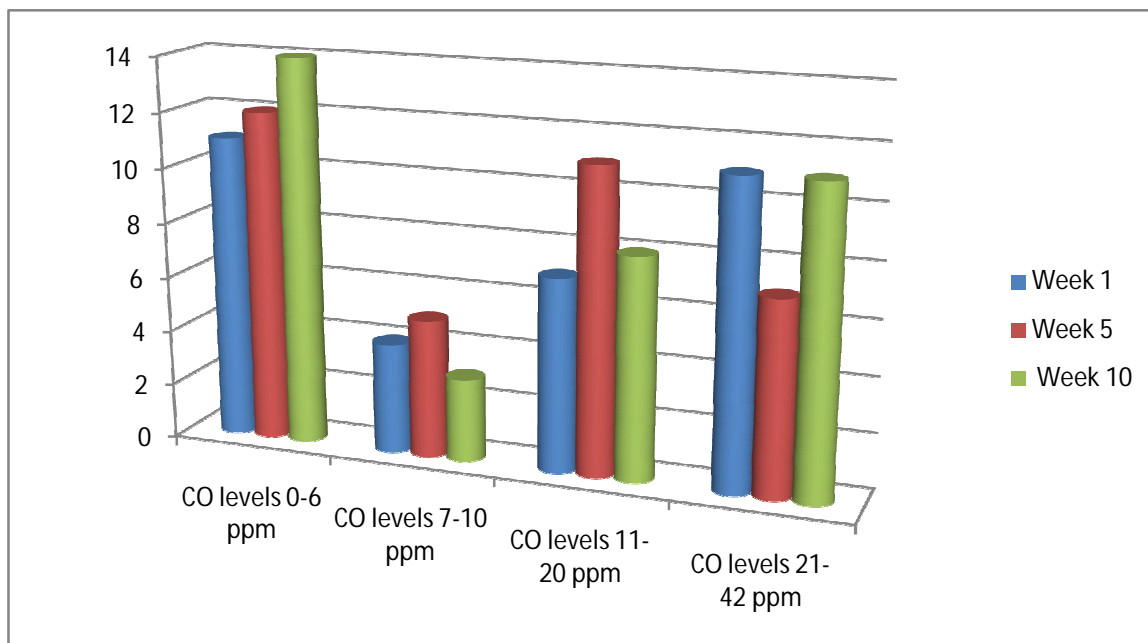
Discussion

Evidence based smoking cessation interventions

In the present study, all the participants were offered weekly counseling either as individuals or in small friendship groups. Many of the participants did not want to use NRT. None of the six successful quitters during the last 2-4 weeks of the study used NRT, although one shisha smoker switched to herbal nicotine free shisha pen as a quitting aid. Our findings supported evidence based smoking cessation intervention which reported that nurses' counseling or advice as very effective (Rice et al. 2013). Combining counseling with NRT and other non-nicotine pharmacological medication was said to yield better results (Stead et al., 2008, West et al. 2013). The duration of our study was probably not long enough for participants who were using NRT and E-cigarette to completely quit and record normal levels of CO. None of our participants used pharmacotherapy / non-nicotine medications. In our study some participants believed in cutting down prior to quitting, but they did not attain the quit status at the end of the 10 weeks.

Tobaccofree campus initiative provided clean environmental air, which is hoped will influence other students' perceptions of smoking being less socially accepted in the college. Twenty three percent (63.9%) of the participants reside with smokers, their biggest challenge will be their ability to resist relapse in the presence of family members and friends who appear to be enjoying smoking cigarette or shisha especially in a social gatherings.

Use of smoking cessation aids

Our study offered participants different flavors of nicotine free shisha pens and electronic nicotine free water pipes but only shisha smokers enjoyed using them and found them helpful in aiding quitting. Cigarette smokers did not think they were good substitute to cigarette, they refused to use them but preferred E-cigarette. None of the participants wanted to use NRT, although some had used them in the past without success.

Previous Quit attempts & methods

When asked about the unsuccessful quitting methods they used, 7 said they stopped buying tobacco products, 5 said, they gradually decreased their tobacco use, 6 said, they engaged in sports, 3 used nicotine gum, 1 used electronic cigar and the remaining 14 said they did not use any method, they just tried to abstain from smoking. These methods have potentials for successful quitting, but also potentials for relapse because of nicotine withdrawal (Stead et al. 2008, Hughes et al, 2003)

Application of Self-efficacy theory

Out of our 13 participants who had high pre-quit SE, 5 were successful in quitting by the last 2-4 weeks of the study. Among the remaining 23 with low SE,   only 1 was successful in quitting. This supports the report by Badr & Moody, (2005); Bandura, (1977), Rankin et al., (2005) that self-efficacy is an important predictor for smoking cessation. Self-efficacy (SE) appears to be the central factor associated with relapse. Individuals with very low SE do not believe in themselves and their ability to quit, so naturally they never attempt to quit, or they have unsuccessful quit attempt. Whereas, individuals with high SE believe they can quit successfully, and usually they attempt to quit and may succeed. Gwaltney et al., (2009) reviewed 54 studies related to the relationship between self-efficacy and smoking quit attempts. Their meta-analysis examined predictors of long term (6 months or more) cessation outcome and found that SE predicted relapse among both self–quitters and treated smokers. They also reviewed the difference in outcome between using multiple-item SE scale and single-item SE scale. They concluded that although multiple-item SE scale incorporated SE ratings across multiple content of high risk situations which should make it more reliable and predictive, single-item SE measure which asked about confidence to quit for specific period of time demonstrated better predictive utility (Gwaltney et al., 2009).

Challenges of Relapse

Relapse is a major challenge for smokers as in other addictive substances. Tobacco Harm Reduction (THR) is being advocated as a type of Relapse Prevention Therapy since it appears that conventional quitting strategies are not making enough impact in preventing relapse nor lowering the death rates attributed to tobacco related NCDs. THR means offering less risky alternatives to regular cigarettes for smokers who cannot or choose not to quit. The idea behind THR is that they will provide smoking cessation aids thereby reducing the number of cigarette smoked daily.

These products are similar to cigarette but contain less toxins and it is believed that reduction in cigarette can lead to increase SE for complete abstinence (Shiffman et al., 2005). Examples of these products are: Personal vaporizer (PV), Electronic nicotine delivery system (ENDS) & Electronic-Cigarette (E-cigarette). They contain different strengths and concentration of nicotine from 500mg to more than 1,000 mg of nicotine which is less than some regular cigarettes. They are either battery operated or electronically operated with USB-power charger. They therefore do not emit carbon monoxide or tar since there are no burning tips of tobacco or other herbs. However, some studies claim that some brands contain formaldehyde a known carcinogen (Berlin, 2015; North Dakota Dept. of Health, 2015). Caponnetto et al., (2011), published case studies of three of their nicotine addicts who successfully stopped smoking and have not suffered any relapse for 6 months by using E-cigarette. Other smoking cessation aids include Nicotine free cigarette, it is said to contain different herbal aroma oils in plastic containers shaped like cigarette, it is said to have a 66% quit rate in heavy smokers. However, there are still some health concerns over the presence of carbon monoxide and tar because they involve burning of herbs before inhaling and exhaling (Quit Smoking Community.org. 2015). The authors of this study are not able to find evidence based studies verifying the 66% quit rate claim.

Nicotine free shisha products, which includes shisha pens and electronic water pipes are other cessation aids for shisha smokers. There are several internet websites advertising them. They claim they are made of electronically delivered herbs, so, no burning tobacco tip, therefore no tar and carbon monoxide, they are free of nicotine and other harmful toxins in tobacco (Hookah-shisha.com: Amazon.com 2015). Although, there are positive reviews on the advertisement sites by people who have used these products, there is no evidence based research verifying their claims. The Centers for Disease Control and Prevention (CDC) is yet to publish fact sheet on their efficacy. National Institute for Health and Care Excellence (NICE) a UK organization, published a 105 page public health guidance (PH45) in June 2013 on Tobacco: harm-reduction approaches to smoking. It stated that although nicotine in tobacco is highly addictive, it is not the cause of illnesses and deaths attributed to tobacco use. The toxins and carcinogens in

tobacco are primarily to blame for the illnesses. It stated that although the best way to reduce the adverse health outcomes is by abrupt quitting, but other ways of reducing the harm from smoking tobacco while cutting down on nicotine prior to quitting can be by using cessation aids which include licensed nicotine–containing products such as transdermal patches, gum, inhalational cartridges, sublingual tablets and nasal spray (NICE, 2013).

Smokeless tobacco is also being advocated as a type of THR. Smokeless tobaccos have long been in existence worldwide and available in different oral and sniffing brands. They are tobacco products so they contain nicotine, carcinogens and toxins. They may not contain tar and carbon monoxide because there are no burning ends but since 1986, the advisory committee of Surgeon General concluded that smokeless tobacco is not a safe substitute for cigarette smoking. It is reported to cause nicotine addiction, cancer of the mouth, esophagus, and pancreas. It is also responsible for precancerous oral conditions such as leukoplakia and noncancerous conditions such as tooth decay / cavities, gum diseases and heart diseases (Mayoclinc, 2015; US Department of Health and Human Services, 1986).

Health effects of the study

Participants who had biological symptoms of coughing, wheezing, SOB and chest pain, reported relief of these symptoms at the fifth week of the study, although some still had high CO levels, they felt healthier than at the beginning of the study. These findings are consistent with facts already published about the effects and benefits of smoking cessation (Centers for Disease Controls and prevention. 2010). Quitting can reduce risks, in the cardiovascular system by reducing blood pressure and heart rates, decrease in carbon monoxide levels in the blood resulting in a sharp drop in the risk of heart attack. Quitting also improves lung function, decrease in coughing, wheezing, shortness of breath etc. Most smokers after being aware of the health hazards of tobacco smoking and the benefits of quitting wish to quit. But, not many are able to translate their wishes into sustainable quitting actions, because of the challenges of nicotine addiction. The initial classification of nicotine as an addictive substance was very controversial. It took several years of research by health scientists before cigarette and other forms of tobacco products were finally declared as addictive in 1988 in US Surgeon General's report (United States Department of Health and Human Services, 2014). In this study, participants with persistent high blood pressure and increased heart rate were advised to consult a physician for further evaluation and treatment.   Hopefully, the take home message that "smoking cessation improves health" was clearly demonstrated from their personal experiences.

Conclusion & Recommendations

This study has demonstrated that counseling with or without smoking cessation aids have potential to reduce cigarette and shisha smoking rate among student nurses. However, the issue of relapse was not addressed in this study. Relapse is the greatest challenge of addiction. The researchers are continuing this study for another 6-12 months, following-up the quitters and encouraging other smokers who want to quit enrolling on the smoking cessation study. The longitudinal study will utilize strategies on how to prevent or minimize relapse.

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