# Pilot study of a 3-day residential treatment for smoking cessation in Hong Kong

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## **ABSTRACT**

INTRODUCTION The Tung Wah Group of Hospitals Integrated Centre on Smoking Cessation has been providing free smoking cessation services since 2009. The average quit rate from 2009 to 2014 was 37%. In order to boost the quite rate, we have implemented a residential treatment program for smokers who volunteered to participate. Having run the program for two years, we conducted a retrospective cohort study to evaluate its effectiveness.

METHODS We recruited the participants who had failed previous quit attempts and who came to seek our smoking cessation services. A 3-day residential program of activities were arranged for our participants. Intensive individual and group counseling was provided. Pharmacotherapy was also provided to alleviate withdrawal symptoms. This was followed by our usual treatment and follow-up program. Self-reported 7-day point prevalence abstinence rate at 26 weeks based on intention-to-treat (ITT) analysis was assessed.

RESULTS A total of 40 clients volunteered to join the program, age 26 to 65 years old with a mean of 44.1 years. There were 25 (62.5%) males and 15 (37.5%) females. The quit rate at 26 weeks was 57.5%. Smokers older than 43 years, having cohabiting smokers, and smoking for more than 28 years, were more likely to quit and this was statistically significant.

**CONCLUSIONS** This pilot study demonstrated that a 3-day residential program is effective in helping addicted smokers who volunteer to quit smoking and is cost effective compared to longer residential programs.

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#### **KEYWORDS**

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# INTRODUCTION

Tobacco smoking is a leading cause of premature death. It can kill 5 million people a year world-wide and will probably kill 8 million people a year between now and  $2030^1$ .

In Hong Kong, substantial effort has been made to ban cigarette advertisements, promulgate a smoke-free environment and raise taxes on cigarettes, and this has led to a decreasing smoking prevalence in recent years. However, according to the Thematic Household Survey Report No. 59 in 2016, there were 646400 current smokers at the time of the census, accounting for 10.5% of all persons aged 15 years and over in Hong Kong<sup>2</sup>. Of these current

smokers, 93.5 % were daily smokers and 6.5% were non-daily smokers.

With the implementation of the Smoking Public Health Ordinance on 1 January 2007 and the increase in tobacco tax by 50% in February 2009, it is expected that more smokers would be motivated to quit smoking. In 2009, the Tung Wah Group of Hospitals, with funding from the Department of Health of Hong Kong SAR, eight integrated centres on smoking cessation were established to provide clinic-based smoking cessation services to help smokers to quit. This service is free of charge for Hong Kong citizens. The clinics are run by family physicians and social workers who have been

trained in smoking cessation. Free NRT or non-NRT medications are provided when necessary<sup>3-5</sup>. In fact, according to the Stead et al.<sup>3</sup> study, the joint effort of clinicians and counsellors has resulted in quit rates at 26 weeks and 52 weeks of 41.9% and 38.9%, respectively.

In our service, the average quit rate from 2009 to 2014 was 37%. In order to boost the quite rate, we implemented a residential treatment program for those who failed to quit smoking. A residential (inpatient) 8-day treatment program for smoking cessation conducted by Mayo Clinic showed that residential treatment for tobacco dependence was associated with significantly greater odds of 6-month abstinence compared with outpatient treatment<sup>6</sup>.

Mylena et al.<sup>7</sup> conducted a study, Five-Day Plan (FDP), for smoking cessation using group behaviour therapy and concluded that the FDP appeared to be an effective smoking cessation therapy.

Residential treatment provides the smoker with a smoke-free and controlled environment that may not be available in a non-residential setting. Residential therapy can provide the opportunity to intensify the counseling intervention with peer experience sharing and support.

In Hong Kong, the working population is very busy and some even have to work on Saturdays, Sundays and even public holidays. It is very difficult to ask them to spare eight days in a residential program for smoking cessation. Therefore, we wished to study the effect and feasibility of a 3-day residential treatment program from Friday to Sunday, in a local setting.

## **METHODS**

## Recruitment

This is a retrospective case review study. From March 2012 to October 2014, smokers who had a history of failed quit attempts and who came to seek our smoking cessation services just before the residential program dates were asked whether they would like to join our program free of charge. The program was jointly run by family physicians and social workers who had been trained in smoking cessation counseling. It was held twice a year and the residential sites were holiday villages in Hong Kong. Smokers who were under 18 years old, physically handicapped, cognitively impaired or had a hospital admission

in the past three months, were excluded for safety and security reasons. Initial assessment included basic sociodemographics, smoking related data, a Fagerström test for nicotine dependence (FTND)<sup>8</sup>, self-efficacy on quitting and past medical history. Informed consent was obtained. Before admission to the residential site, a family physician would screen each client to assess suitability for admission and a medical treatment plan was formulated.

## Intervention

The 3-day program involved residence overnight on Friday and Saturday, and ended on late afternoon Sunday. The participants were offered medical consultation, exercise prescription, pharmacotherapy and group counseling to enhance their motivation. They were also provided with an opportunity for social support and learning new coping skills through interactive and experiential practice. During the 3-day period, medical rounds by doctors were conducted each morning and medications for smoking cessation, which included nicotine replacement therapy (NRT) and non-NRT, would be prescribed and adjusted if necessary. Their use was determined by medical conditions and the participant's preference.

Intensive counseling was conducted by experienced social workers who had been trained in smoking cessation, and included motivational interview, acknowledgement of barriers and coping, decisional balance, understanding conditioning and un-conditioning, exploration of emotions, performing relapse prevention activities, and teaching new skills on coping with stress and mood management. Exercise was also taught, and included Qigong: 'Ba Dua Jin' (Eight Section Brocade Chi Kung)<sup>9</sup>.

After the residential treatment, the participants were followed up in the same manner as other non-residential smokers in our centre, i.e. weekly for the first 2 weeks and every 2 weeks for the rest of the treatment phase, lasting from 8–12 weeks depending on whether NRT or non-NRT was prescribed. During each follow-up visit, a Bedfont Smokerlyzer (carbon monoxide analyzer) was used to ascertain abstinence. At each visit, individual counseling medical treatment would continue until completion of the whole treatment phase, as for our non-residential smokers. At 26 weeks, a phone follow-up

was conducted to get a self-reported smoking status. Table 1 gives the program activities during the 3-day residency.

# Statistical analysis

Descriptive statistics were used to analyze basic sociodemographics. Chi-squared test was used for

Table 1. Program activities of the 3-day residency

Program Activities 1	Assertiveness training through real life scenario and role play
Theme	Content
Role play*	Each participant described his/her smoking condition during social gathering and tried to imagine how he/she could refuse to smoke in such an environment. Our staff would draft a script for each participant. Each participant had a chance to do the role play and other members would help to act as well.
Sharing*	Experience sharing; discussion on refusal techniques. Understanding the psychological factors of smoking in a social environment.
Program Activities 2	Psycho-education on harmful effects of smoking through illustration of information in video format and experiential experiments
Theme	Content
Trigger thinking on smoking experience*	After burning different things, a cigarette was lit up.  Participants were asked to observe the burning of a cigarette, speed of burning and color changes.  This triggered their thinking on their years of smoking experience.
Understanding the harmful effects of smoking*	Broadcasting films on quit smoking and films on harmful ingredients of cigarettes.  Discussion topics: personal consumption of cigarettes and harmful ingredients received.
Visual health impact of smoking*	Film on demonstration of color change of a pig's lungs when experimenting passive smoking.  Topic for discussion: health problems after years of smoking.  Topics for sharing: how is your health?
Program Activities 3	Discussion topics: personal consumption of cigarettes and
Theme	Content
Mood*	Put all pictorial cards related to mood on the tables. Participants were asked to pick one and other members tried to guess the mood of a particular participant. Before guessing, the members may be asked: What is the mood today? What are you worrying most? How do you describe yourself today?
Feeling/passion on smoking*	Each participant would be given 5 pictorial cards with answers to the following questions:  1. What is the feeling during smoking.  2. What is the feeling during lapses when quitting.  3. How is my psychological craving?  When staff read out a question, the participants were required to put up a card corresponding to the answer and explain why they chose this answer.
Program Activities 4	Miscellaneous activities
Theme	Content
Building support network; self-disclosure; personal sharing*	Each participant was asked to tell his/her own story on smoking and quitting by pictorial drawing, e.g. years of smoking, when to smoke, quit experience, who urges him/her to quit etc.
Impulse control training both cognitive and behavioural means*	Participants were asked to share previous experiences on urges other than smoking, e.g. shopping, eating and alcohol drinking etc.  Activities related to cognitive behaviour therapy were then practiced, e.g. stop, think of options, choose, and act.
Stress management training through identification of source of stress and facilitating personal stress reduction methods*	In the form of games and drawings, participants were able to understand different sources and intensity of stress. They would share different ways to cope with stress.

Continued

Table 1. Continued

Program Activities 4	Miscellaneous activities
Theme	Content
Relaxation training through progressive muscular relaxation and guided imagery; expressive art exercise*	Started with relaxation exercises and then shared feelings after seeing a tranquil picture of nature. Tried to imagine the clean and fresh air, the green of woods and the smell of flowers, the flow of water in the river or brooks, the singing of birds. Tried to help participants to map out a spiritual picture of their own. Finally, they were asked to imagine what would happen after quitting smoking.
Coaching on handling high risk situations*	Participants in the form of groups of two persons were asked to go to cigarette vendor, e.g. convenient store nearby the camp site, stay for a while to stare at the cigarettes in the shop, imaging that they were trying to buy cigarettes.  Note down the reaction and feeling and think of ways to withhold the buying attempt. Or they might be asked to go to places where there were smokers around and note their feelings and reactions. After that, they shared their feelings and experiences with other members.
Relaxation training	Participants would learn different relaxation exercises and deep breathing techniques.
Experiential learning on the effectiveness of behavioral distractions & education on nicotine dependence*	Practicing different methods of distraction after a very brief tactile stimulation by a cigarette without actual smoking. They would then receive a talk on how tobacco addiction was formed, the concept on psychological craving and ways of handling it.
Review personal values and their relationship with smoking cessation*	Through auction games, participants were asked to bid several things that deemed valuable to them such as good health, life insurance, lifelong free cigarettes, 3-minute enjoyment, welfare of family members etc. At the end, the staff tried to relate smoking to their auction result.
Promote understanding of the role of cigarettes in the participants' life*	Participants were asked to perform tests on Enneagram of personality types for mapping their nine possible personalities. Staff would help them to understand their psychological needs and their reasons behind smoking.
A Chinese mind-body aerobic exercise	The Eight Section Brocade Chi Kung (Ba Dua Jin Qigong) was taught and practiced. (Bock et al. <sup>13</sup> ; Jahnke et al. <sup>14</sup> ; Chen et al. <sup>15</sup> ). This is a form of stretching and deep breathing exercise that may help to reduce smoking urges.

<sup>\*</sup>Participants were asked to write down a summary of the learning points in each session.

statistical analysis among the quitters and non-quitters; and p<0.05 was considered as statistically significant.

The outcome measure was a self-reported 7-day point prevalence abstinence rate at 26 weeks, based on intention-to-treat (ITT) analysis. Participants who were not able to be followed-up or with missing responses on smoking status were considered still smoking.

## RESULTS

We were able to retain all participants during this program. All had received pharmacotherapy with 39 participants (97.5%) on NRT and 1 participant (0.5%) on Varenicline. On the average, we were able to recruit 6 participants for each session. The basic sociodemographics of the participants are shown in Table 2. A total of 40 clients volunteered to join the program, age from 26 to 65 years old with a mean

of 44.1 years. There were 25 (62.5%) males and 15 (37.5%) females, and 17 (42.5%) were married. In all, 42.5% had a monthly income of HK\$10000 to HK\$19999 (US\$1250 to US\$2500), and 70% had finished Secondary school education. The average cigarette consumption per day was 17 and the mean score for the Fagerström test for nicotine dependence (FTND) was 4.6 (maximum 10). Eleven (27.5%) had a history of mental illness. In general, all participants had rated quitting to be of high importance, with a mean score of 82 out of 100, and had great perceived difficulty in quitting, with a mean score of 70.6 out of 100.

The quit rate at the earlier follow-up at 8 weeks with verification by Smokerlyzer was 70% (n=28) while the self-reported quit rate at 26 weeks was 57.5% (n=23). We were able to trace and contact all participants at this time point. To test each sociodemographic and smoking-related variable

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Table 2. Basic sociodemographics of participants and smoking related variables (N=40)

e (years) 44.	1 ± 9.3
•	
nder	
ile	25 (62.5)
male	15 (37.5)
nrital status	
gle	11 (27.5)
rried/cohabiting	20 (50)
dow/divorced/separated	9 (22.5)
ucation	
mary school or lower	1 (2.5)
-F3	11 (27.5)
-F7	23 (57.5)
st-Secondary or Tertiary	5 (12.5)
onthly income (HKD)	
0000	13 (32.5)
000–19999	17 (42.5)
000–29999	5 (12.5)
0000	3 (7.5)
t disclosed	2 (5)
ar of smoking 25	2 ± 9.6
garettes per day 17.	1 ± 10.8
gerström score 4.0	6 ± 2.6
evious quit attempts 2.	7 ± 2.1
habiting smokers	6 (15)
received importance of quitting (0-100) 82	<u>+</u> 17.1
received difficulty of quitting (0-100) 70.0	6 ± 18.8
received confidence of quitting (0–100) 63.4	4 ± 19.5
story of mental illness*	11 (27.5)

<sup>\*</sup>Both past or current psychiatric illnesses requiring regular follow-up by psychiatrist.

that could give the biggest difference in quit rate at 26 weeks, we dichotomized these variables to identify which one could yield a statistically significant quit rate. Table 3 shows that smokers older than 43 years, married or cohabiting, and smoking for more than 28 years were more likely to quit, and this was statistically significant. Having quit more than once was marginally significant.

Table 3. Comparison of characteristics of quitters and non-quitters at 26 weeks

non-quitters at 20 weeks									
Sociodemographic	0	Non-							
& smoking related variables	Quitter n (%)	quitter n (%)	$\chi^2$	Cramer's V	p				
Age (years)	( ' 0 /	( • • • )	5.013	0.354	0.02**				
≤ 43	8 (40)	12 (60)							
> 43	15 (75)	5 (25)							
Gender	, ,	, ,	1.153	0.17	0.283				
Male	16 (64)	9 (36)							
Female	7 (47)	8 (53)							
Marital status			5.013	0.354	0.025**				
Married/cohabiting	15 (75)	5 (25)							
Single/separated/ divorced/ widowed	8 (40)	12 (60)							
Income (HKD)			3.086	0.285	0.08				
< 20000	16 (53)	14 (47)							
≥ 20000*	7 (88)	1 (12)							
Years of smoking			9.548	0.489	0.002**				
≤ 28	11 (41)	16 (59)							
> 28	12 (92)	1 (8)							
Cohabiting smoker			1.687	0.205	0.194				
yes	2 (33)	4 (67)							
no	21 (62)	13 (38)							
Cigarettes per day			0.628	0.125	0.428				
≤ 19	12 (52)	11 (48)							
> 19	11 (65)	6 (35)							
Fagerström score			3.008	0.274	0.083				
≤ 5	17 (68)	8 (32)							
> 5	6 (40)	9 (60)							
Quit attempts			3.672	0.303	0.055				
1	9 (82)	2 (18)							
>1	14 (48)	15 (52)							
Importance (0-100)			0.234	0.076	0.629				
≤ 90	16 (55)	13 (45)							
> 90	7 (64)	4 (36)							
Difficulty (0-100)			2.283	0.239	0.131				
≤ 75	15 (68)	7 (32)							
> 75	8 (44)	10 (56)							
Confidence (0-100)			0.051	0.036	0.822				
≤ 50	10 (56)	8 (44)							
> 50	13 (59)	9 (41)							
History of mental illness			2.774	0.263	0.096				
yes	4 (36)	7 (64)							
no	19 (66)	10 (34)							

<sup>\*\*</sup>p<0.05 is considered as statistically significant. \*Two missing data (not disclosed).

## **DISCUSSION**

This report describes the high rate of smoking abstinence from a 3-day residential smoking cessation start-up program. The reasons for the apparent efficacy of this residential treatment are many. One important element of our program is the combined use of group behavioral treatment and pharmacological therapy, of which the efficacy has been well established<sup>10,11</sup>. In addition, our participants were able to practice the skills, and not just learning the skills, in relapse prevention<sup>12</sup>. The skill training was done by experienced social workers who had been trained in behavioral counselling; this differs from many other residential programs that are conducted by health professionals. We also incorporated relaxation exercise and a Chinese aerobic stretching exercise (The Eight Section Brocade Chi Kung)<sup>13-15</sup>. The outcomes in the residential group per se could also be influenced by the greater expense in terms of time commitment required by the participants. The time-cost of residential treatment undoubtedly results in the selection of more motivated smokers. However, we did have some recruitment difficulty in this program but we are not able to give a number, as many smokers felt that they did not have the time to participate.

A few studies on residential programs have demonstrated their effectiveness. However, these programs vary from 4 to 14 days, with different recruitment methods and sampling subjects<sup>6,7,16-18</sup>. A 4-day residential program for tobacco dependence by Green et al. 17 reported a 6-month abstinence rate of about 26%. Results from the Mayo Clinic 8-day residential smoking cessation program indicate higher self-reported 7-day point prevalence smoking abstinence for the residential (45%) versus outpatient (26%) groups at 6 months<sup>19</sup>. In contrast to the Mayo Clinic, which is a referral centre, our service is a primary care setting and the smokers are entirely self-referred through our quit-smoking hotline. However, direct comparison between these residential programs cannot be made because of the different characteristics of participants and interventions.

The present study is the first short residential progam for smoking cessation in Hong Kong. Since this is a pilot study, there are several limitations. The main limitations are the small sample size and that the treatment was not randomized. The medication was self-selected after discussion of options with physicians. The participants had previous failed quit attempts and hence could have had past experience with smoking cessation therapy, which might have contributed to a positive response to treatment. The observational nature of the current study also limits our ability to make causal inferences about the higher smoking abstinence rates observed or its generalizability to other smoking populations. Whether residential treatment is truly superior to other methods of treatment can only be determined with a high degree of certainty from a randomized controlled trial. We do not provide biochemical confirmation of 6-month smoking abstinence and yet we are able to yield an abstinence rate of 70% after 8 weeks, with verification by Smokerlyser. Although self-reported abstinence without biochemical confirmation may lead to overestimates of abstinence rates, a previous study has indicated that selfreported abstinence did not differ appreciably from that with biochemical verification<sup>20</sup>.

As to the comparison of quitters and non-quitters at 26 weeks, there are some commonalities with a study in Hong Kong that showed that older age, being married/cohabiting and years of smoking were independent predictors of quitting<sup>21</sup>. However, unlike this previous study, our study does not indicate daily cigarette consumption, Fagerström test score for nicotine dependence or having mental illness as independent predictors. This may be due to the fact that this is an intragroup comparison and the different characteristics of the participants are dichotomized to give the biggest difference in quit rate at the 26 weeks. Besides, the subjects are only those who joined the program and the sample size is too small.

# **CONCLUSIONS**

This pilot study is an observational study. It involves clients who have failed previous quit attempts and are motivated to quit smoking. The quit rate is higher compared with our outpatient setting. It is comparable to or even surpasses some overseas studies with longer duration of residence. It appears that a 3-day residential program from Friday to Sunday as a start-up in a local setting is feasible and can save the cost of longer residential programs. It provides an effective

alternative to help those addicted smokers who want to seek help to quit smoking.

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## **CONFLICTS OF INTEREST**

Authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none was reported.

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# PROVENANCE AND PEER REVIEW

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