# Smoking cessation programme: the Singapore General Hospital experience

H C Zow, A A L Hsu, P C T Eng


## ABSTRACT

**Introduction: The National Health Survey in Singapore reported that the prevalence of smoking had decreased from 20 percent in 1984 to 15 percent in 1998. This may be due to the efforts of smoking cessation education established island-wide. In this study, we review the efficacy of the Singapore General Hospital smoking cessation programme and examine the efficacy of different treatment modalities.**

**Methods: We studied the immediate quit rate and point prevalence abstinence rates at six and 12 months in our telephone survey. Subjects were patients who attended our programme from June 1999 to December 2002. Pharmacotherapeutic aids utilised with counselling sessions were individualised.**

**Results: The study populations for outpatient and inpatient arms were 394 patients and 425 patients, respectively. In the outpatient programme, mean age was 46 years (range of 12 to 80 years), and the ratio between males and females was 8.6. The outpatient immediate quit rate was 33 percent, and the six and 12 month quit rates were both 36 percent. However, in the inpatient programme, mean age was 65 years (range of 15 to 93 years), and the ratio between males and females was 4.9. The six and 12 month quit rates of the inpatient arms were 30 percent and 32 percent, respectively. Although there is no statistically significant difference in the different treatment modalities, the immediate quit rates for bupropion only and counselling only were relatively higher (36 percent and 41 percent, respectively). These were sustained at more than 35 percent at six and 12 months follow-up. We achieved comparable efficacy compared to published data. Counselling, as a sole therapy, can be effective in a select patient group. One-time inpatient counselling achieved a quit rate (32 percent at 12 months) far superior to previously- reported self-quit rate (3 percent and 8 percent at 12 months).**

**Conclusion: We strongly recommend that all inpatients who are smokers to be routinely referred for counselling.**


**Keywords: bupropion, counselling, nicotine dependence, pharmacotherapy, smoking cessation**

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**Department of Respiratory & Critical Care Medicine**
**Singapore General Hospital**
**Outram Road**
**Singapore 169608**

H S Zow, BSc
Psychologist

A A L Hsu, MBBS, FRCP, FCCP
Senior Consultant

P C T Eng, MBBS, FACP, FAMS
Senior Consultant

**Correspondence to:**
Ms Huey-Chin Zow
Tel: (65) 6321 4700
Fax: (65) 6227 1736
Email: gm3zhc@sgh.com.sg

## INTRODUCTION

Tobacco smoking is the single most preventable and predictable cause of morbidity and mortality. Worldwide, smoking is responsible for at least 3 million deaths a year[1]. In Singapore, smoking-related diseases are responsible for >2,600 deaths a year, or seven deaths a day[2]. Since the 1970s, the government has been involved in tobacco control campaigns and activities in Singapore. From 1984, anti-smoking education has been advocated through smoking control programmes established at community centres, hospitals, schools and workplaces. A National Health Survey in 1998 showed that the smoking prevalence had decreased from 20% in 1984 to 15% in 1998[3]. Although several studies have been published in major journals on the efficacy of smoking cessation programmes, there is currently no published local or regional data. This study was conducted to review the effectiveness of the Singapore General Hospital (SGH) smoking cessation programme and to examine the efficacy of different treatment arms in this programme.

## METHODS

The SGH smoking cessation programme was officially launched in June 1999. This included an outpatient treatment programme and a one-time counselling for inpatients. Group therapy was also available which consists of one 30-minute individual evaluation session and four 45- minute group counselling sessions. Appropriate clinical recommendations were given, based on the first clinic visit with the smoking cessation clinic medical officer. The patients would be routinely given an appointment

with the smoking cessation counsellor, who was a psychologist.

Pharmacotherapy recommended was individualised, which included sustained-release bupropion, 16 hour nicotine patch, and nicotine inhaler. Patients who were more than 18 years old and without medical contraindication for pharmaceutical aid were matched with one or more of these aids targeted at their smoking and behavioral pattern. The regime for various pharmaceutical aids used in the programme were: (1) sustained-release bupropion: 150mg per day was given for the first six days, followed by 150mg twice daily for eight weeks; (2) 16 hour nicotine patch- starting with 15mg nicotine patch for eight weeks, followed by 10mg for two weeks and 5mg for two weeks, one patch daily; (3) nicotine inhaler- initially six to 12 cartridges per day for eight weeks, thereafter three to six cartridges per day for two weeks, followed by one to three cartridges per day for two weeks.

Patients who were under 18 years old or with medical contraindication for pharmaceutical aids received counselling only. Inpatient counselling involved 15 minutes face-to-face counselling. Patients would be referred to the outpatient programme if they needed further assistance on smoking cessation. Patients who attended at least one counselling session in the smoking cessation programme between June 1999 and December 2002 were included in the outpatient treatment programme. The study population for inpatient counselling was smokers admitted to SGH and who were referred for smoking cessation counselling. After the last counselling session, the patients were followed-up at six and 12 months through a telephone survey.

The main outcomes analysed were: outpatient immediate quit rate, outpatient and inpatient point-prevalence abstinence rates followed-up at six and 12 months, and quit rates of outpatients in different treatment arms. Immediate success of quitting was defined as a statement that smoking had stopped totally before or at the last counselling session. The individual self-reported smoking status was assessed in each session by exhaled carbon monoxide level using mini smokerlyzer as a smoking biochemical marker. A measurement of carbon monoxide level in expired air of $\leq$6ppm was considered a valid reported abstinence[4]. The six and 12 month point prevalence abstinence rates were defined as self-reported smoking status at the time of the telephone survey.

Descriptive statistical analyses were performed to assess the overall immediate quit rates, six and 12 month quit rates, and the efficacy of different treatment arms. Chi-square test was used to evaluate the association between quit rates and number of sessions attended, and the association between quit rates and different treatment arms. Stepwise logistic regression analysis was applied to identify predictors for each quit rate. The factors included in the model were the number of sessions attended and the different treatment arms.

**Table I: Characteristics of outpatients and inpatients.**

| Characteristic | No. of outpatients | No. of inpatients |
|---|---|---|
| **Sex** | | |
| Male | 353 (90%) | 353 (83%) |
| Female | 41 (10%) | 72 (17%) |
| **Mean age (range)** | 46 years (12-80 years) | 65 years (15-93 years) |
| **Co-morbidity** | | |
| Respiratory diseases | 235 (32%) | 515 (42%) |
| Cardiovascular diseases | 162 (22%) | 274 (23%) |
| Other diseases | 245 (32%) | 366 (31%) |
| Nil | 102 (14%) | 43 (4%) |
| **Profession** | | |
| Professionals | 36 (9%) | |
| Administration/ sales | 40 (10%) | |
| Technical | 46 (12%) | |
| Home-maker / retiree | 89 (23%) | Data not |
| Military | 41 (10%) | collated |
| Student | 69 (18%) | |
| Unemployed / unknown | 16 (4%) | |
| Miscellaneous | 57 (14%) | |
| **Source of referral** | | |
| Within SGH | 184 (46%) | |
| Health centres | 28 (7%) | |
| Inpatient referral | 23 (6%) | |
| Other hospitals or medical centres | 7 (2%) | Data not |
| Schools | 59 (15%) | collated |
| Self-referral | 63 (16%) | |
| Military | 16 (4%) | |
| Others | 14 (4%) | |

## RESULTS

The characteristics of the outpatients and inpatients are presented in Table I. Intra-departmental referrals within SGH constituted the major source of outpatient referrals. Forty-two patients were discharged from the programme after the first session because they were more interested in acupuncture or hypnotherapy, or they could not afford the costs of treatment. A total of 436 outpatients attended at least one session between June 1999 and December 2002. The group therapy had enrolled 11 patients in

**Table II: Abstinence rates of outpatients who attended different number of sessions and inpatients who received one-time brief counselling.**

| Counselling completed | Immediate quit rate* (n+) | 6 months quit rate** (n+) | 12 months quit rate** (n+) |
|---|---|---|---|
| Outpatient | | | |
| 1 session | 8% (106) | 24% (78) | 33% (54) |
| 2 sessions | 30% (93) | 30% (74) | 29% (66) |
| 3 sessions | 47% (126) | 43% (116) | 36% (101) |
| 4 sessions | 61% (46) | 55% (31) | 79% (14) |
| 5 sessions | 30% (23) | 36% (22) | 33% (15) |
| p-value | <0.0005 | 0.004 | 0.132 |
| Overall | 33% (394) | 36% (321) | 36% (250) |
| Inpatient brief counselling | NA (425) | 30% (243) | 32% (175) |

* Based on self-reported smoking cessation and exhaled carbon monoxide level at the last counselling session.

** Point-prevalence abstinence rates based on self-reported smoking cessation at the telephone follow-up survey.

n+ total number of patients evaluated.

**Table III: Abstinence rates of outpatients in different treatment arms.**

| Counselling and | Immediate quit rate* (n+) | 6 months quit rate** (n+) | 12 months quit rate** (n+) |
|---|---|---|---|
| Bupropion | 36% (89) | 38% (74) | 36% (66) |
| Nicotine patch | 30% (67) | 35% (51) | 36% (28) |
| Nicotine inhaler | 9% (32) | 21% (24) | 33% (18) |
| Bupropion and nicotine patch | 39% (33) | 23% (30) | 23% (26) |
| Bupropion and nicotine inhaler | 33% (21) | 38% (21) | 47% (17) |
| Nicotine patch and nicotine inhaler † | 22% (9) | 100% (2) | 100% (1) |
| Bupropion and nicotine patch and nicotine inhaler | 17% (18) | 25% (16) | 23% (13) |
| No pharmacotherapy | 41% (125) | 43% (103) | 38% (81) |
| p-value | 0.237 | 0.304 | 0.791 |

* Based on self-reported smoking cessation and exhaled carbon monoxide level at the last counselling session.

** Point-prevalence abstinence rates based on self-reported smoking cessation at the telephone follow-up survey.

n+ total number of patients evaluated.

† Excluded from analysis because of the very small numbers.

the programme, with only four patients completing all five sessions. There were 446 inpatients referred for smoking cessation counselling during the same period. Of these, 21 were enrolled into the outpatient programme for further counselling and pharmacotherapy. These patients were grouped under the outpatient programme in the analysis of outcomes. Therefore, the study populations for outpatient and inpatient arms were 394 patients and 425 patients, respectively.

The overall outpatient immediate quit rate, and six and 12 month quit rates of outpatients and inpatients, and quit rates of outpatients who attended different number of sessions are presented in Table II. For the outpatient programme, subjects who attended more counselling sessions were more likely to quit at the last counselling sessions ($p<0.005$) and at 6 months follow-up ($p=0.004$). However, this were not apparent at 12 months follow-up ($p=0.132$). The quit rates of outpatients in the different treatment arms are shown in Table III. There is no statistical difference at immediate, six and 12 month quit rates between the treatment arms. Using stepwise logistic regression, only the number of sessions was significant at immediate and six month quit rates ($p<0.0005$ and $p=0.019$, respectively). For the quit rate at 12 months, neither the number of sessions nor the treatment arms were significant. However, except for bupropion only and no pharmacotherapy arms, the numbers of patients in the remaining treatment arms were small. The immediate quit rates for bupropion only and no pharmacotherapy arms were relatively higher (36% and 41%, respectively) and these were sustained at >35% at 6 and 12 months follow-up.

## DISCUSSION

Previous published data on smoking cessation programme in hospital or outpatient settings reported quit rates of between 19% and 35.5% at 12 months follow-up[5-10]. The programme in SGH has achieved comparable efficacy compared to these data, which included different pharmaceutical aids[5-10]. Unlike the reported decay in abstinence rate over time[8], our overall abstinence rates appeared to be more sustained. In our programme, we aimed to provide at least four individual counselling sessions of 30-minute duration as recommended by the United States Agency for Healthcare Research and Quality[11]. We found that more counselling sessions have an impact on immediate and six month quit rates; however, this was not apparent on 12 month quit rate. The optimal number of sessions for individual

counselling to achieve long-term quit rate needs to be evaluated in future studies.

In terms of pharmaceutical therapy, we showed similar findings in the efficacy of different pharmaceutical aids, as illustrated in previous published trials[8-10]. However, it is difficult to compare the various pharmacotherapies due to the heterogeneity in the published trials. In our study, the efficacy of the different treatment arms was similar. However, except for bupropion recipients and patients who received only counselling, the numbers in each treatment arm were small and all patients were not randomly assigned to the different treatment arms. Bupropion recipients had a higher long-term abstinence rate and patients who were not suitable for pharmaceutical therapy also has a high immediate quit rate, which was maintained at >35% during follow-up at 12 months. In practice, pharmacotherapy should be individualised rather than randomly assigned. This was probably one of the reasons for the relatively high and sustained quit rates in our programme. More research is needed before evidence-based pharmacotherapy algorithms can be formulated.

We could not analyse the results of group therapy due to the small sample size. Few patients were interested in the group sessions. The main reason given by our patients was that the group programme was time-consuming. The group therapy consists of a single 30 minute individual evaluation session and four group sessions lasting 45 minutes each. During group counselling, it usually takes a longer time to provide mutual support and share resources among group members who face common problems. It is possible that group therapy is less popular and efficacious in heterogeneous Asian populations.

For one-time inpatient counselling, which involved 15 minutes of face-to-face counselling, a quit rate of 32% at 12 months follow-up were achieved. This was far superior to previously- reported self-quit rate of 3% to 8%[12-14]. Previous studies also showed that providing brief smoking cessation counselling during hospitalisation, where patients are at a time of perceived vulnerability and where the hospital environment of smoking is strictly prohibited, may increase patients motivation to stop smoking[15-17]. Reported 12 month quit rates for inpatient counselling range from 22% to 35% in different studies[15,16,18]. Munafo et al[19] reported that enhancing the smoker's motivation for change during hospitalisation is important in encouraging patients to quit smoking.

There are several limitations in this study. First, it is a retrospective study. Therefore, the outpatients were not randomly assigned to different treatment arms and the numbers in some treatment arms were small. In addition, unaccounted sources of bias, such as the patient's preference for specific pharmacotherapy, may have skewed the efficacy of different treatment arms. Secondly, self-reported abstinence, in the absence of other confirmatory sources such as biochemical and third party verification, may overestimate the cessation rate. Finally, the impact of one-time inpatient counselling may not be significant as these patients are more likely to quit due to the episode of acute illness. We are currently analysing the matched data of smokers admitted during the same period and those who did not receive one-time counselling.

On conclusion, despite its limitations, the quit rates of the smoking cessation programme in SGH are comparable, if not superior, to previous studies on such programmes in hospitals or outpatient settings involving different pharmaceutical aids. The good results achieved in this study may be partly due to the use of multiple pharmacological aids during the counselling sessions. Patients who received only counselling because of contraindication for pharmacotherapy achieved good quit rates in the programme. Counselling, as a sole therapy, can be effective in a select patient group. The good results of brief inpatient counselling may indicate that hospitalisation is a critical period to motivate patients to quit smoking. We strongly recommend all smokers to be routinely referred for counselling during hospitalisation.

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