The effect and cost of smoking cessation services provided by community pharmacists in Thailand: A descriptive study approach

Sunee Lertsinudom[1,3], Nadthatida Hansuri[2], Ampornpan Theeranut[3], Piyameth Dilokthornsakul[4]

[1]*Division of Clinical Pharmacy, Faculty of Pharmaceutical Science, Khon Kaen University, Thailand,* [2]*Community Pharmacy, Faculty of Pharmaceutical Science, Khon Kaen University, Thailand,* [3]*Training Center for Enhancing Quality of Life of Working Age People, Faculty of Nursing, Khon Kaen University,* [4]*Center of Pharmaceutical Outcomes Research, Department of Pharmacy Practice, Faculty of Pharmaceutical Sciences, Naresuan University, Muang, Phitsanulok, Thailand*

Corresponding Author:
Piyameth Dilokthornsakul,
Center of Pharmaceutical
Outcomes Research,
Department of Pharmacy
Practice, Faculty of
Pharmaceutical Sciences,
Naresuan University, Muang,
Phitsanulok, Thailand.
E-mail: piyamethd@nu.ac.th,
piyamethd@gmail.com

ABSTRACT

Introduction: The effect and cost of smoking cessation provided by pharmacists was varied and important for policy decision making. **Aims:** The aim of the study was to estimate the effect and cost of smoking cessation provided by community pharmacists in Thailand. **Method:** A descriptive study was carried out. Participants were followed up for 6 months. The service was provided by community pharmacists with face-to-face counseling or telephone counseling. Primary outcomes were continuous abstinence rate (CAR) at week 24 and direct medical cost under a provider perspective. **Results:** A total of 90 participants were included with 96.7% male with an average age of 45.99±15.65 years old. CAR at week 12 was 33.3%, while CAR at week 24 was 20.0%. The average number of cigarette consuming was statistically decreased from ten cigarettes/day to one cigarette/day (*p*<0.001). The total cost of smoking cessation service was 45,573 Thai baht (THB) consisting of labor cost (12,533 THB), material cost (21,223 THB), and capital cost (11,817 THB). The average cost/participant was 506 THB and the average cost/ successful quit was 2531 THB at week 24. **Conclusion:** Smoking cessation service program provided by community pharmacists is effective with relatively low cost/success rate at 24 weeks after the initiation of smoking cessation.

Keywords: Cost, smoking cessation, community pharmacy, Thailand

INTRODUCTION

Smoking is an important problem worldwide. According to a World Health Organization report,[1] smoking is the most important but preventable cause of morbidity and mortality. Approximately 1.1 billion persons are current smokers or 23% of population. Europe has the highest rate of current smokers with 33% of population, while Southeast Asia has 24% of population as current smokers.[2]

Smoking is an important risk factor for many diseases[1-5] such as cardiovascular diseases, respiratory diseases, and cancer. In addition, smoking also affects individuals' quality of life. Previous studies indicate that smokers have lower quality of life than non-smokers.[6-8] Moreover, several studies showed that smokers have the higher cost of living, in particular cost of medical treatment, than non-smokers.[9-11] Therefore, health authorities around the world would like to control the problem by focusing on the reduction of the number of new smokers and helping current smokers to quit smoking.

Community pharmacy in Thailand is one of primary care units which could provide smoking cessation service. Most pharmacists in Thailand are trained for giving a smoking cessation consultation during their bachelor degree, master degree, or doctoral degree in Pharmacy schools. In addition, community pharmacy is usually located near communities, and easy to access that is important for long-term care including

smoking cessation. Therefore, community pharmacy is a good alternative health-care unit for providing smoking cessation. A previous report[12] revealed that smoking cessation service provided by pharmacists in community pharmacy is able to reduce the number of current smokers by 30–40%. It could also improve individuals' quality of life with high satisfaction of the service. However, the study did not report the number of continuous abstinence rate (CAR) which is an important outcome of smoking cessation service.

Previous studies[13] estimated the cost of smoking cessation service in Thailand. A study estimated the cost of smoking cessation service by the Thailand National Quitline service in Thailand. The authors reported that the average cost/completed counseling was 31 US dollars, while the average cost/quitter was 253 US dollars.[13] Another study estimated the cost of a community pharmacy-based smoking cessation program. It showed that the average cost of the program was 189 US dollars.[14] However, the study was conducted in 2006 which knowledge and interventions of smoking cessation have been changed since the study was conducted. Little is known of the cost of smoking cessation service by community pharmacists to date and its clinical outcomes. Therefore, this study aimed to determine the effect of smoking cessation service provided by community pharmacists in community pharmacy and its cost.

MATERIALS AND METHODS

Overall Description

This study was a descriptive study involving clinical outcomes and cost under the provide perspective. It was conducted in a community pharmacy of Faculty of Pharmaceutical Science, Khon Kaen University at Khon Kaen, Thailand from October 2014 to December 2015. The study was approved by the Khon Kaen University Ethics Committee in Human Research (IRB number 00011189).

Participants

Current smokers aged 15–60 years old who visited the pharmacy from October 2014 to December 2015 were asked for smoking cessation service. All participants who agreed to participate in the service were included. Participants were followed for at least 24 weeks. Information and consent form were provided for each participant. For participants who aged <18 years, the information and consent were provided to their parents and required the parental consent.

Smoking Cessation Service Provided by Community Pharmacists

Smoking cessation service was provided by the trained pharmacists at the pharmacy. The trained Pharmacists gave a smoking cessation consultation to a participant individually by adapting the 5-A's smoking cessation treatment for providing smoking cessation consultation.[15] The smoking cessation consultation was undertaken approximately 20 min/session.

Briefly, the 5-A's smoking cessation treatment consists of five steps of consultation: (1) Ask for smoking behavior, (2) advice for smoking cessation and provide important information on smoking consequences and benefits of quit smoking, (3) assess the readiness for quit smoking of the participants using transtheoretical model of change consisting of pre-contemplation, contemplation, preparation, action, and maintenance[16] and nicotine dependence using Fagerstrom test for nicotine dependence,[17] (4) assist to making a plan for quit smoking that could be consultation only for participants with mild nicotine dependence or pharmacotherapy for participants with moderate to severe nicotine dependence, and (5) arrange for the follow-up visits which could be face-to-face counseling or telephone counseling.

For participants who required pharmacotherapy, nicotine gum was the first-line medication, while nortriptyline was the first-line medication for patients who had a history of depression or anxiety. Adjuvant therapies including smoking cessation, *Vernonia cinerea* lozenges, 0.5% sodium nitrate mouthwash, or *Vernonia cinerea* tea could be considered on the case-by-case basis. The medications were used in accordance to Thai smoking cessation guideline.

Participants were followed up for 6 times at week 0, 2, 4, 8, 12, and 24. Telephone counselling was provided for patients who could not visit the pharmacy for follow-up visit.

Outcome Measures and Costs

The primary clinical outcome of interest was continuous abstinence rate (CAR). It was defined as the number of successful participants divided by the total number of participants. The successful participant was defined as the participant who could continuously quit smoking after the smoking cessation consultation until week 12 or week 24 after the initiation of smoking cessation consultation. The secondary clinical outcomes were the number of cigarette, peak expiratory flow rate (%PEFR), and carbon monoxide level (pCO).

The total cost, average cost per individual, and average cost per quit rate were estimated. The costs included labor cost, material cost, and capital cost. The wage of pharmacists was the only labor cost in this service. It was calculated by multiplying average service time for smoking cessation with the average wage of pharmacists and divided by total working time. Material cost included medication cost, telephone service cost, cost of utilities (water supply, electricity, and internet), cost of peak flow meter, and cost of pulmonary carbon monoxide meter calibration. Capital cost included cost of pulmonary carbon monoxide meter, cost that the pharmacy spent to maintain its facilities and utilities, and cost of computer. All costs were converted to the year 2018 value using consumer price index for medical sector.[18]

Statistical Analysis

Descriptive statistics were used to describe participant characteristics, clinical outcomes, and cost. Wilcoxon Signed-Rank Test was used to compare outcomes between baseline and endpoint when applicable.

RESULTS

Participant Characteristics

A total of 90 participants were included. All participants completed 24 weeks follow-up either by pharmacy visit

follow-up or telephone follow-up. The average age was 46.0 ± 15.6 years old. Eighty-seven participants were male (96.7%). Sixty-nine participants (76.7%) were assessed as low nicotine dependence (Fagerstrom score <4). The average number of cigarettes smoked was 16.7 ± 17.4 pack-years. The average smoking cessation attempt before the inclusion in this study was 1.8 ± 2.2 times [Table 1]. Most previous attempt was the cessation with no assistance (62.5%). All participants were in preparation stage according to transtheoretical model of change.

CAR and Related Clinical Outcomes

A total of 30 participants could continuously quit smoking at 12 weeks (CAR = 33.3%); however, the number decreased to 18 participants (CAR = 20.0%) at week 24. However, most participants (62.2%) were still in preparation stage and did not quit smoking. The average number of cigarettes smoked per day decreased from 10.0 ± 12.0 cigarettes/day to 1.0 ± 6.2 cigarettes/day ($P < 0.001$) at week 24. The %PEFR was evaluated in only 23 participants. We found that the median %PEFR statistically increased from 87.5% at baseline to 93.6% at week 24 ($P = 0.003$). The pCO was evaluated in only 22 participants. We found that smoking cessation by pharmacists could statistically decrease pCO level from 9.0 ± 10.5 ppm to 4.0 ± 3.2 ppm ($P = 0.005$) [Table 2].

Cost of Smoking Cessation Service Provided by Community Pharmacists

The total cost of smoking cessation service in our cohort was 45,573 Thai baht (THB). The average cost was approximately 506 THB per participant. Material cost was the major cost driver

which was accounted for 46.5% of the total cost. A majority of material cost was medication cost which was accounted for 74.0% of the material cost (15,715/21,223 THB) or 34.5% of total cost (15,715/45,573 THB). Considering the CAR, the average cost was 1519 and 2531 THB/successful participant at week 12 and week 24, respectively [Table 3].

Table 2: Continuous abstinence rate and related clinical outcomes

Outcomes	Value	P-value
Continuous abstinence rate (No., %)		
At week 12	30 (33.3)	N/A
At week 24	18 (20.0)	
Number of cigarette per day		
At week 0	10.0±12.0	<0.001
At week 24	1.0±6.2	
Mean %PEFR (*n*=23)		
At week 0	87.5%	0.003
At week 24	93.6%	
Pulmonary carbon monoxide (*n* = 22) (ppm)		
At week 0	9.0±10.5	0.005
At week 24	4.0±3.2	

ppm: Part per million

Table 3: Smoking cessation service cost provided by community pharmacists (Year 2018 value) in Thai baht (THB) per one course of service treatment

Types of cost	Sub-type of cost	Cost (THB)
Labor Cost	Wage of all pharmacists	12,533
Sub-total		12,533
Labor cost/participant		139
Material cost	Medicine	15,715
	Telephone	563
	Drinking water	457
	Electricity charge	256
	Internet access	23
	Peak flow meter	337
	Mouth piece	823
	Calibration of carbon monoxide meter	3,048
Sub-total		21,223
Material cost/participant		236
Capital Cost	Carbon monoxide meter	9,018
	Pharmacy maintenance	2,620
	Computer	177
Sub-total		11,817
Capital cost/participant		131
Total cost		45,573
Average cost/participant		506
Average cost/successful participant at week 12		1,519
Average cost/successful participant at week 24		2,531

Table 1: Baseline characteristics of participants

Baseline	No. of participant (%)
Age (mean ±SD)	46.0±15.6
Gender	
Male	87 (96.67)
Female	3 (3.33)
Underlying disease	
Asthma	2 (2.22)
Chronic obstructive pulmonary disease	8 (8.89)
Diabetes mellitus	6 (6.67)
Hypertension	1(14.44)
Number of cigarette used (pack-years)	16.7 ± 17.4
Number of smoking cessation previously attempt	1.8 ± 2.2
Nicotine dependence at baseline	
Fagerstrom < 4 points	69 (76.67)
Fagerstrom pe4 points	21(23.33)
Motivation of smoking cessation*	
Own health	69 (66.7)
Family reason	44 (48.9)
Economic reason	9 (10.0)
Social reason	8 (8.9)
Others	3 (3.3)

*Participants could have >1 motivation

Treatment Pattern

All participants were counseling and followed up by community pharmacists. Sodium nitrate mouthwash was the most common smoking cessation medication. A total of 39 participants (24.4%) received the mouthwash. Thirty-seven participants (23.1%) were treated with nicotine gum. *Vernonia cinerea* lozenge and *Vernonia cinerea* tea were also commonly used to help participants to quit smoking. Thirty-three participants (20.6%) received *Vernonia cinerea* products. Other medications used to help participants to quit smoking in the pharmacy were nortriptyline (four participants) and bupropion (two participants).

DISCUSSION

This study investigated the effect and service cost of smoking cessation service provided by community pharmacists. We found that approximately 20% of participants who were in preparation stage of change could continuously quit smoking for at least 6 months. We also found that cost per participant was approximately 500 THB/participant.

The CAR found in this study was similar to a previous Thai study.[19] The study was conducted to determine factors associated with smoking cessation in a hospital setting. Hospital counseling with pharmacotherapy options was allowed in the study. They found that the CAR was 25.1% and 17.6% at week 12 and week 24, respectively. In addition, the CAR slightly decreased for week-to-week. For our study, we found that the CAR was 33.3% and 20.0% at week 12 and week 24, respectively. The pattern of CAR reduction was also similar. These indicated that the effectiveness of smoking cessation service provided by community pharmacists in Thailand is relatively similar to smoking cessation service provided by hospital staffs.

Smoking cessation service cost found in this study was lower than what reported in a previous study.[20] The study reported the cost of smoking cessation service of approximately 6,000 THB/individual, while we found only 500 THB/individual. The difference might be due to the difference in costing method. The previous study included cost of service, training cost for pharmacists for smoking cessation service, and medication cost, while our study did not include the training cost for pharmacists for smoking cessations service. However, our study included capital cost that the previous study did not.

Smoking cessation service in Thailand is obviously effective, cost-effective, and good investment in Thailand in various setting. A cost-effectiveness study showed that smoking cessation service in community pharmacies was a cost-saving strategy in Thailand,[20] while another cost-effectiveness study[21] indicated that smoking cessation was the cost-saving strategy when hospital counseling and telephone counseling were provided. In addition, a recent cost-benefit study indicated that smoking cessation service was a good investment with an average return of investment of 1.35.[22]

Even though, smoking cessation service provided by community pharmacist is effective and low cost, many barriers are still explicit. A recent national survey study in Thailand[23] indicated that only 37% of community pharmacists (152/413 respondents) provided smoking cessation service. Barriers were unable to follow-up smokers, inadequate staffing, lack of time, lack of population demand, and no smoking cessation products at their pharmacies. The barriers might affect the implementation of smoking cessation service by community pharmacists in Thailand.

Several limitations were needed to be discussed. First, this study was conducted in only one pharmacy under an academic institute. Generalizability might be limited within pharmacies with similar characteristics. Second, this study followed-up participants closely which might not be the case in general practice in pharmacies in Thailand. Therefore, the CAR for other pharmacies might be lower than what observed in this study. Third, this study followed-up participants for only 6 months to determine the CAR and cost. The CAR might be lower when the followed-up was up to 1 year and cost could be higher. However, a recent study[24] indicated that the CAR at week 52 is a minimally lower than that at week 24 for all medications. Last, this study did not include the training cost for pharmacists for smoking cessation service. It might underestimate the cost found.

CONCLUSION

Our study indicated that smoking cessation service by community pharmacists is effective at low-cost. It could promote continuous smoking cessation at week 12 and week 24 after the initiation of smoking cessation. Our findings are important for health-care decision-making to consider smoking cessation service provided by community pharmacists into their public services and coverage.

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