

ประสิทธิผลของโปรแกรมเลิกบุหรี่โดยการใช้นวัตกรรมปลอกนิ้วเท้า กดจุดสะท้อนเท้าร่วมกับการสัมภาษณ์เพื่อสร้างแรงจูงใจ

Effects of the Smoking Cessation Intervention Combining Toe Sheath Acupressure with Motivational Interviewing

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บทคัดย่อ

การสภาพติดบุหรี่ก่อปัญหาด้านสาธารณสุขทั่วโลก การวิจัยนี้เพื่อศึกษาประสิทธิผลของการใช้ปลอกนิ้วเท้ากดจุดสะท้อนเท้ากับการสัมภาษณ์สร้างแรงจูงใจเพื่อช่วยเลิกบุหรี่ ในกลุ่มตัวอย่างที่ได้จากการสุ่มแบบเจาะจงจำนวน 116 คนซึ่งแบ่งเป็น 4 กลุ่ม คือ 1) กลุ่มควบคุมไม่ได้รับการแทรกแซงใดๆ 2) ได้รับกิจกรรมการสัมภาษณ์สร้างแรงจูงใจ 3) ได้รับปลอกนิ้วเท้ากดจุดสะท้อนเท้า และ 4) ได้รับกิจกรรมการสัมภาษณ์สร้างแรงจูงใจร่วมกับได้รับปลอกนิ้วเท้า เก็บข้อมูลก่อนทดลองและในเดือนที่ 1, 3, 6, 9 วิเคราะห์ข้อมูลด้วยสถิติ repeated measures MANCOVA

ผลการวิจัยพบว่าผู้ใช้ปลอกนิ้วเท้ากดจุด TSA (68.97%) เกิดความรู้สึกว่ากลืนและรชาติของบุหรี่เปลี่ยนไปจนรู้สึกไม่่อยากสูบในระดับมากถึงมากที่สุด การแทรกแซงมีผลต่อจำนวนการสูบบุหรี่ ($F (3,925.354) = 4.444, p = .006$, Eta Squared = .116) กลุ่มควบคุม แสดงการสูบบุหรี่ต่อวัน สูงกว่ากลุ่ม MI และกลุ่ม MI plus TSA ($\Delta = 6.485, p = .015; \Delta = 6.125, p = .026$) อย่างมีนัยสำคัญทางสถิติ

ดังนั้นการสัมภาษณ์สร้างแรงจูงใจอย่างเดียวจะเพียงพอในการช่วยเลิกบุหรี่ เนื่องจาก ผลลัพธ์ไม่แตกต่างกันอย่างไรก็ตามการใช้ปลอกนิ้วเท้ากดจุดสะท้อนเท้ากับเป็นทางเลือกทางหนึ่งในการช่วยเป็นจุดเริ่มต้นในการลด ละ เลิกบุหรี่ นอกจากนี้ ควรใช้ MI เพื่อปรับเปลี่ยนความรู้ความเข้าใจสำหรับผู้สูบบุหรี่ต่อไป

คำสำคัญ: ปลอกนิ้วเท้า, กดจุดสะท้อนเท้า, การเลิกบุหรี่, การสัมภาษณ์เพื่อสร้างแรงจูงใจ

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วันที่รับ (received) 19 มิ.ย. 2565 วันที่แก้ไขเสร็จ (revised) 4 ก.ย. 2565 วันที่ตอบรับ (accepted) 25 ก.ย. 2565

Abstract

Tobacco use is a major public health problem worldwide. This study examined the effects of the invented toe sheath acupressure (TSA) combined with motivational interviewing (MI) as a treatment for smoking cessation. One hundred and sixteen smokers were divided into 4 groups: control group, MI group, TSA group, and MI plus TSA group. Data were collected at baseline and 1, 3, 6, and 9 months after interventions. Data were analyzed by using repeated measures MANCOVA

Results showed that smokers (68.97%) reported that there was a high level of the unpleasant smell of cigarettes after using the invented TSA which made them reduce smoking cravings. The treatments could significantly reduce smoking ($F(3,925.354) = 4.444$, $p = .006$, Eta Squared (η^2) = .116). The control group showed significantly higher cigarettes smoked per day than those in the MI group and the MI plus TSA group ($\Delta = 6.485$, $p = .015$; $\Delta = 6.125$, $p = .026$, respectively).

In conclusion, using only MI may be sufficient to facilitate smoking cessation as the results were not different when compared to the MI plus TSA treatment. However, the TSA applied reflexology could be an alternative means to initiate quitting smoking. Also, MI should be used to affirm cognitive modification for smokers.

Keywords: toe sheath, acupressure, smoking cessation, motivational interviewing

Introduction

Tobacco use is a major public health problem worldwide. The World Health Organization reported that globally, there would be 1.083 billion tobacco users in 2025. Worldwide, smoking causes more than 8 million deaths per year. Of these deaths, 7 million were the result of direct tobacco use, whereas 1.2 million people died from second-hand smoke.¹ In Thailand, the prevalence of smoking in 2010 was approximately 23%, amounting to about 12.3 million smokers. The WHO projected that if further intensive smoking control succeeded then in 2025, the prevalence of smokers would reduce to 20% or approximately 11.8 million smokers.²

In 2007, WHO issued a practical method for tobacco control briefly called “MPOWER” (Monitoring tobacco prevention and regulatory policy, Protecting, Offering to help people quit, Warning about the dangers of cigarettes, Enforcing anti-propaganda about cigarettes, and Raising cigarette tax).¹ This study focused on the third component which is to offer a

way to help people quit smoking.

Reflexology is a complementary and alternative medicine that has used the reflexes map of the feet to reflex all organs and body parts.³ It was explained that after receiving foot massages at specific areas of the toe, smokers lost the desire to smoke because cigarettes smelled bitter.⁴ Previous studies reported that foot reflexology was effective in treating tobacco addiction. Smokers insisted that there was an unpleasant smell of cigarettes after receiving a specific point of toe massage, so it could help them reduce smoking cravings.^{4,5,6} To date, studies of toe massage for smoking cessation have been scarce.

Interestingly, motivational interviewing (MI) is an effective counseling method to strengthen motivation for change. It guides individuals to explore and resolve ambivalence about change while the interviewer encourages them by expressing empathy, developing discrepancy, rolling with resistance, and supporting self-efficacy. Many previous studies showed

that participants who had MI were more likely to quit smoking.^{7,8,9} In this study, the effectiveness of using the invented toe sheath acupressure (TSA) applying reflexology alone and combined with motivational interviewing (MI) as a treatment for smoking cessation was examined.

Objectives of the study

The purposes of the study were to examine whether the innovative toe sheath applying reflexology alone, or MI alone, or the innovative toe sheath combined with MI were most effective for assisting Thai smokers to quit smoking. The invented toe sheath acupressure (TSA) applying reflexology was expected to be one of the innovative solutions for smoking cessation.

Hypothesis of the study

We expected that there were relationships between using the invented toe sheath acupressure and the number of cigarettes smoked per day, motivation to stop smoking, intention to stop smoking, knowledge of the harm of cigarettes, and nicotine dependence, when controlling for age, years of smoking, income, and gender.

Methods:

Research participants

The sample size was calculated by using the G*Power program with the following assumptions: effect size of .25, the significance level of .05, power of .80, and 4 different treatment groups, 4-occasion measurement, the relationship between each measurement of .5, and the deviation adjustment of 1.0. A sample size of 24 participants in each study area was calculated.¹⁰ However, a total of 116 participants were willing to join the study.

Sample selection was done by the purposive sampling method. The inclusion criteria included:

1) aged 20 years old or over, 2) had baseline FTND scores of at least 5 points, and 3) smoked continuously for the past 1 month. Participants were excluded: 1) if they had a mental disorder, and 2) had severe health problems.

Materials and measurements

The toe sheath acupressure was designed by Thanat Dolampornphisuts, a reflexology expert in Thailand, and the researchers. The sheath was made from rubber and on the inner side, there were twelve tiny buttons for toe massage while the participant is wearing it and walking. Participants were asked to wear the invented toe sheath 10 minutes a day for 9 months.

The outcome measures were collected by a questionnaire composed of the number of cigarettes smoked per day (QS), motivation to stop smoking (MoTQ) (10 items), intention to stop smoking (IntQ) (10 items), and knowledge of the harm of cigarettes (KN) (10 items). Nicotine dependence was measured by the Fagerström Test for Nicotine Dependence (FTND) (6 items).

Data collection

Data were collected from participants in communities in 3 provinces in Thailand: Udonthani, Pitsanulok, and Suphanburi for a multi-site study design to help confirm the confidence of the study results. The participants were divided into 4 groups as follows: 1) 26 smokers in the control group lived normally without any interference 2) 32 smokers in the MI group received only MI activities. They had conversations in small groups or individually to find motivation and goals in their lives and determine the time and way to quit smoking; 3) 28 smokers in the toe sheath acupressure (TSA) group received the invented toe sheath to use every day for 10 minutes a day, and 4) 30 smokers in the TSA plus MI group

received MI activities and the toe sheath. At the beginning of the program and the end of months 1, 3, 6, and 9, the researchers visited them and repeated MI activities, and assess the outcome measures of all groups.

For the MI activities, the researchers met the participants in groups at months 0, 1, 3, 6, and 9, and conducted MI activities. The researchers were trained to use the 5A protocol (Ask about tobacco use, Advice to quit, Assess willingness to quit, Assist in a quit attempt, and Arrange to follow up) suggested for healthcare professionals and nurses' roles which could lead to awareness of people to stop smoking. For smokers who were not ready to quit, it was suggested to use the 5R protocol to guide them which includes Relevance: encourage smokers to indicate personal relevance to quit smoke; Risks: identify negative points of tobacco use; Rewards: Identify potential paybacks of quitting smoke, such as improved health and saving money; Roadblocks: help smokers to identify barriers to quitting and provide means for treatment; and Repetition: Repeat these steps at every visit.¹¹

Data analysis

Descriptive statistics were used to analyze demographic data, while repeated measures MANCOVA was used to investigate the effectiveness of the interventions by controlling for confounding variables including age, years of smoking, income, and gender.

Ethical issue:

This research was approved by the Research Ethical Committee of Sirindhorn College of Public Health, Phitsanulok Province, Thailand, project number 3041601, ethical approval code SCPHPL 2/3561 – 4, on 25 April 2018.

Results

The majority of participants were male (n = 106). Most participants started smoking at 19 years old. About 77.59% had no children or family members with allergies in their families. They said that they were persuaded to smoke by friends (61.61%). They revealed that they smoked to release stress (26.7%). There were statistically significant differences in the number of cigarettes smoked per day, and FTND scores ($p < .05$). However, there were no significant differences among the four groups for the IntQ, KN, and MoQ scores ($p > .05$).

The analysis of data using MANCOVA in Table 1 reveals that time is not significant at .05 (Wilk's lambda = .885, F (12, 91) = .989, p = .465), indicating that the combined outcomes did not show significant change across four occasions. However, there was a significant interaction effect between time and group (Wilk's lambda = .580, F (36, 269.597) = .989, p = .465), suggesting that the changes in the combined outcomes differ across treatment groups.

Table 1 Results of Multivariate Analysis using MANCOVA (n = 116)

	Effect	Wilks' Lambda	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Between Subjects	Intercept	.395	37.881	4.000	99.000	.000	.605	
	age	.977	.593	4.000	99.000	.668	.023	
	Years of smoking	.988	.296	4.000	99.000	.880	.012	
	income	.960	1.025	4.000	99.000	.398	.040	
	gender	.976	.608	4.000	99.000	.658	.024	
	group	.799	1.932	12.000	262.221	.031*	.072	
Within Subjects	Time	.885	.989	12.000	91.000	.465	.115	
	Time* age	.867	1.167	12.000	91.000	.319	.133	
	Time* years of smoking	.898	.862	12.000	91.000	.587	.102	
	Time* income	.975	.192	12.000	91.000	.999	.025	
	Time* gender	.884	.992	12.000	91.000	.463	.116	
	Time* group	.580	1.518	36.000	269.597	.035*	.166	

*p-value < .05

In Table. 1, a Wilk's lambda, a multivariate test, is statistically significant at .05 (Wilk's lambda (12, 262.221) = .799, p = .031, $\eta^2 = .072$), suggesting that the intervention significantly influenced the combined four outcomes.

Table 2 Comparisons of outcome variables measuring levels of smoking addiction and knowledge about cigarettes at 1, 3, 6, and 9 months after the intervention (n = 116)

	Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	IntQ	738.103	1	738.103	6.082	.015*	.056
	KN	1947.713	1	1947.713	16.685	.000*	.141
	MotQ	6397.362	1	6397.362	109.066	.000*	.517
	QS	1659.764	1	1659.764	7.971	.006*	.072
age	IntQ	1.162	1	1.162	.010	.922	.000
	KN	58.858	1	58.858	.504	.479	.005
	MotQ	116.455	1	116.455	1.985	.162	.019
	QS	131.142	1	131.142	.630	.429	.006
Years of smoking	IntQ	6.322	1	6.322	.052	.820	.001
	KN	31.484	1	31.484	.270	.605	.003
	MotQ	2.146	1	2.146	.037	.849	.000
	QS	59.249	1	59.249	.285	.595	.003

Table 2 Comparisons of outcome variables measuring levels of smoking addiction and knowledge about cigarettes at 1, 3, 6, and 9 months after the intervention (n = 116)

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
income	IntQ	17.051	1	17.051	.140	.709	.001
	KN	4.982	1	4.982	.043	.837	.000
	MotQ	163.036	1	163.036	2.780	.099	.027
	QS	5.191	1	5.191	.025	.875	.000
gender	IntQ	55.622	1	55.622	.458	.500	.004
	KN	18.875	1	18.875	.162	.688	.002
	MotQ	41.102	1	41.102	.701	.404	.007
	QS	185.398	1	185.398	.890	.348	.009
group	IntQ	669.869	3	223.290	1.840	.145	.051
	KN	363.727	3	121.242	1.039	.379	.030
	MotQ	213.666	3	71.222	1.214	.308	.034
	QS	2776.062	3	925.354	4.444	.006*	.116
Error	IntQ	12379.521	102	121.368			
	KN	11907.232	102	116.738			
	MotQ	5982.910	102	58.656			
	QS	21239.315	102	208.229			

*p-value < .05

Abbreviations: QS = number of cigarettes smoked per day, MotQ = motivation to quit scores, IntQ = intention to quit scores, KN = scores of knowledge about adverse effects of smoking

Between-subject analysis provides results in Table 2 and shows that the intervention only affected

the number of cigarettes smoked per day (QS) significantly at .05 (F (3,925.354) = 4.444, p = .006, $\eta^2 = .116$). However, motivation to stop smoking (MoTQ), intention to stop smoking (IntQ), and knowledge of the harm of cigarettes (KN) were not statistically affected by the intervention.

Table 3 Pairwise comparisons among treatment groups for the number of cigarettes smoked per day (n = 116)

Groups	Mean Difference	Std. Error	p-value	95% Confidence Interval for Difference	
				Lower Bound	Upper Bound
Control group & MI group	6.485*	2.093	.015*	.854	12.115
Control group & TSA group	1.320	2.212	1.000	-4.631	7.272
Control group & MI plus TSA group	6.125*	2.098	.026*	.479	11.771
MI group & TSA group	-5.164	2.246	.141	-11.208	.879
MI group & MI plus TSA group	-.360	1.899	1.000	-5.468	4.749
TSA group & MI plus TSA group	4.805	2.198	.187	-1.109	10.719

*p-value < .05

The research participants were divided into 4 groups as follows: 1) 26 smokers in the control group lived normally without any interference; 2) 32 smokers in the MI group received only MI activities.; 3) 28 smokers in the toe sheath acupressure (TSA) group received the invented toe sheath to use every day for 10 minutes a day, and 4) 30 smokers in the TSA plus MI group received MI activities and the toe sheath.

The results of pairwise comparisons of the number of cigarettes smoked per day (QS) among treatments and control groups in Table 3 show that

the MI group significantly differs from the control group (mean difference = 6.485, $p = .01$, and that the MI plus TSA group statistically differs from the control group (mean difference = 6.125, $p = .026$). However, the number of cigarettes smoked per day (QS) was not statistically different between the following pairs: MI vs. TSA, MI vs. MI plus TSA, and TSA vs. MI plus TSA group.

Figure 1 Comparison of changes in the number of cigarettes smoked per day across four different treatment groups at 1, 3, 6, and 9 months after the intervention.

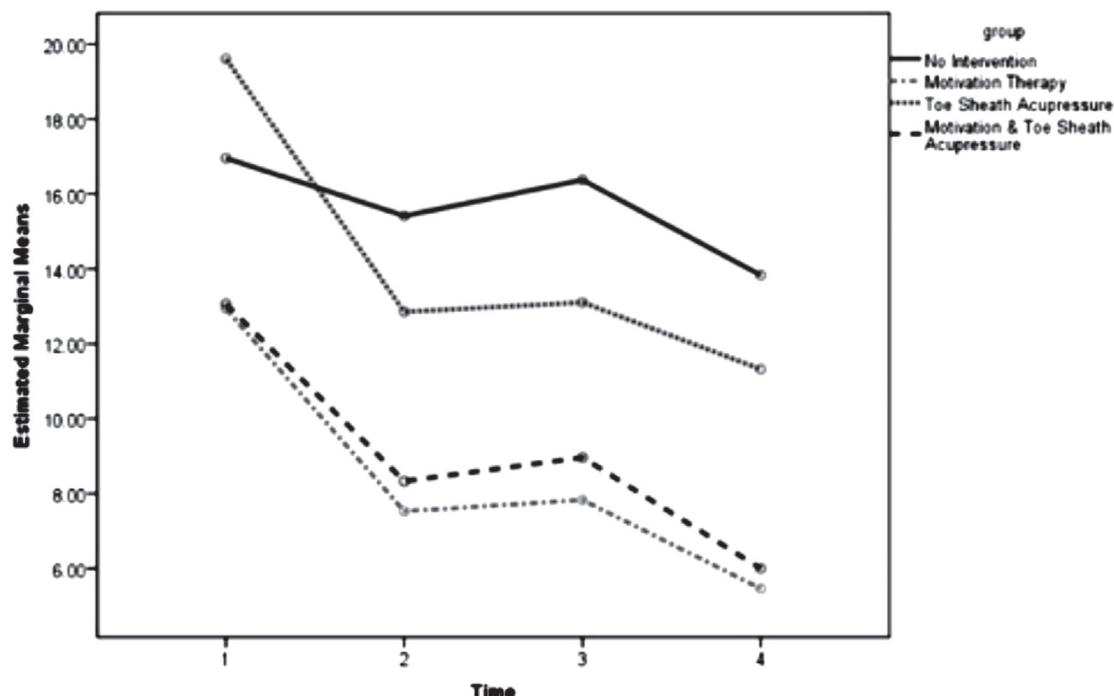


Figure 1 showed changes in the number of cigarettes smoked per day measured 4 times (point 1 = 1 month; point 2 = 3 months; point 3 = 6 months; and point 4 = 9 months) for the four intervention groups. The number of cigarettes smoked per day decreased from time 1 to time 4 in all treatment groups: 1) The blue bold line represents the control group; 2) The green dot line represents the MI group; 3) The red dot line represents the toe sheath acupressure (TSA) group, and 4) The purple dot line represents the TSA plus MI group.

In addition, Figure 1 showed changes in the number of cigarettes smoked per day measured 4 times (1, 3, 6, and 9 months) for the four intervention groups. It shows that the number of cigarettes smoked per day decreased from time 1 to time 4 in all 4 groups. However, the MI group and the MI plus TSA group had the largest decreases in the number of cigarettes smoked per day among the four groups.

Table 4 Numbers of participants with got zero Fagerström (FTND) scores at the end of the research project (n = 116)

Group	Numbers of persons with zero FTND scores	%
Control group	0/26	.00
MI group	15/32	46.88
TSA group	11/28	39.29
MI plus TSA group	12/30	40.00
Total	38/116	32.76

Abbreviations: MI = motivational interviewing, TSA = toe sheath acupressure

Table 4 showed that at the end of the project 32.76% of the 116 participants could quit smoking with zero FTND scores in the MI group, TSA group, and MI plus TSA group.

Discussion

The results showed that MI alone and the TSA plus MI were most effective for smoking cessation. So, we could not confirm the effectiveness of TSA alone on smoking cessation. Previous studies reported that quitting cigarettes was related to psychological factors, such as difficulty in recognizing and expressing emotions. Therefore, giving MI may be helpful because it is an individual focusing technique that benefits people who want to quit smoking.^{7,8} MI aims to help people to find their reasons and ways to stop smoking. MI may make smokers feel comfortable with their choices and plans, so they can better comply with practices that are suggested.⁷

There was evidence of the effect of foot reflexology on smoking cessation^{5,6}, but more on auricular acupressure.^{12,13,14} Previous studies showed that smoking cessation rates in foot reflexology by trained therapists were higher than those in the control group (47.6% and 12.5%, respectively, p<.05).⁵ When using the effects of foot reflexology performed by trained therapists combined with Thai aroma

essential oils with the use of nicotine gum, they could decrease nicotine withdrawal symptoms, increase relaxation, and decrease nicotine withdrawal symptoms.⁴ Accordingly, the invented TSA in this study could also make smokers (68.97 %) feel that there was an unpleasant smell of cigarettes and made them reduce smoking cravings. This study showed that, at the end of the project, 39.29% of participants could quit smoking with zero number of cigarettes smoked per day and zero FTND scores in the TSA group, and 40% in the MI plus TSA group. MI alone proved to be an efficient technique to help people quit smoking and MI may also make smokers comply with treatments that are suggested. However, there were no changes in scores of motivation to stop smoking, intention to stop smoking, and knowledge of the harm of cigarettes. This may imply that they are not significant factors related to quitting smoking. Interestingly, toe reflexology can reduce smoking cravings, however, the true mechanism of foot reflexology on smoking cessation is still unclear, therefore, more scientific studies are needed to find the precise mechanism.

Conclusions

This study supports the effectiveness of the invented TSA by applying reflexology for smoking cessation. Overall, the MI group and the MI plus TSA group had lower scores on number of cigarettes smoked per day than those in the control group and the TSA group at all time points. Either MI alone or MI plus TSA could reduce the number of cigarettes smoked per day similarly. Remarkably, the invented toe sheath acupressure applying reflexology could be a gadget to initiate smoking cessation.

Research limitations: This study has some limitations. First, although our goal was to develop the foot reflexology innovation to reduce the workload of trained reflexologists, it is questionable whether pressure from the toe sheath was equal to pressure applied by trained therapists. Second, we did not perform blinding and randomization when assigning participants to different treatment groups. Future rigorous studies, such as randomized controlled trials, are needed.

Conflict of interest: The author reports no conflicts of interest in this work.

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