

Effect of Thai traditional massage on “craving” response in individuals receiving alcohol dependency treatment in rehabilitation stage at Thanyarak Institute

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- Research Purpose** : *Thai traditional massage (TTM) can mitigate drug craving such as cigarette. Nevertheless, further finding is required in order to investigate the effect of massage on alcohol craving.*
- Objective** : *To study alcohol craving in subjects receiving TTM*
- Setting** : *Thanyarak Institute*
- Research Design** : *Cross-over experimental design*
- Population sample** : *18 males hospitalized for alcohol dependency treatment in rehabilitation stage*
- Research Methodology** : *Data was obtained by having patients completed computerized-self-evaluation forms comprising of Penn Alcohol Craving Scale, Visual Analog Scale and blood pressure / pulse rate while they were stimulated by video of alcohol consumption. The samples undertook the evaluation forms in 3 days including the day with no activity, the day with TTM, and the day with reading newspapers. The latter two activities were randomly assigned alternately. The data were analyzed by Generalized Estimating Equations (GEE).*

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- Finding** : *Alcohol craving level in the day with TTM was lower than reading activity and no activity ($p < 0.01$). There was no difference of alcohol craving level between reading activity and no activity ($p = 0.4$). In addition, TTM reduced the stimulated, anxious, hungry, high, paranoid, tongue-tied and bad feelings ($p < 0.01$). However, there was no effect of TTM on restlessness. TTM also lowered systolic/diastolic blood pressures and pulse rate ($p < 0.01$).*
- Conclusion** : *TTM reduced alcohol craving, other feelings as well as blood pressures and pulse rate of the subjects who were stimulated with pictures of alcohol consumption.*
- Keywords** : *Thai traditional massage, craving, alcohol dependence, rehabilitation stage, Thanyarak Institute.*

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ณัฐนรี ชื่นชูจิตต์, รัศมน กัลยาศิริ. ผลของการนวดแผนไทยต่อความอยากแอลกอฮอล์ในผู้ที่
เข้ารับการบำบัดการติดแอลกอฮอล์ในระยะฟื้นฟู ณ สถาบันธัญญารักษ์. จุฬาลงกรณ์เวชสาร
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- เหตุผลของการทำวิจัย** : การนวดแผนไทยสามารถลดความอยากเสพสารเสพติด เช่น บุหรี่ ได้
อย่างไรก็ตาม ยังไม่เคยมีการศึกษาผลของการนวดแผนไทยต่อความ
อยากแอลกอฮอล์มาก่อน
- วัตถุประสงค์** : เพื่อศึกษาเปรียบเทียบความอยากแอลกอฮอล์ขณะที่ได้รับและไม่ได้
รับการนวดในผู้ที่เข้ารับการบำบัดการติดแอลกอฮอล์ในระยะฟื้นฟู
- สถานที่** : ณ สถาบันธัญญารักษ์
- ประชากรตัวอย่าง** : ชาย 18 คน ที่เข้ามารับการบำบัดการติดแอลกอฮอล์ในระยะฟื้นฟู
- วิธีการศึกษา** : เก็บรวบรวมข้อมูลโดยใช้แบบประเมินตอบด้วยตนเองบนหน้าจอ
คอมพิวเตอร์ ซึ่งประกอบด้วยแบบประเมินความอยากแอลกอฮอล์
Penn Alcohol Craving Scale (PACS) ฉบับภาษาไทย แบบประเมิน
ความรู้สึกรู้สึก Visual Analog Scale (VAS) และวัดสัญญาณชีพ ขณะถูก
กระตุ้นความอยากแอลกอฮอล์ โดยใช้วิดีโอทัศน์ภาพแอลกอฮอล์ โดย
กลุ่มตัวอย่างจะทำแบบประเมินดังกล่าวทั้งหมด 3 วัน คือ วันที่ไม่ได้รับ
กิจกรรมใด ๆ วันที่ได้รับการนวด และวันอ่านหนังสือพิมพ์ จากนั้นทำ
การสลับวันที่ได้รับการนวดหรือวันอ่านหนังสือพิมพ์แบบสุ่ม นำข้อมูล
ที่ได้มาวิเคราะห์ด้วยสถิติ Generalized Estimating Equations (GEE)
- ผลการศึกษา** : ความอยากแอลกอฮอล์ในวันที่ได้รับการนวดแผนไทยต่ำกว่าวันที่
ไม่ได้รับการทำกิจกรรมใด ๆ และวันอ่านหนังสือพิมพ์ ($p < 0.01$) ทั้งนี้
ความอยากแอลกอฮอล์ในวันที่ไม่ได้รับกิจกรรมใด ๆ ไม่มีความแตกต่าง
กันกับวันอ่านหนังสือพิมพ์ ($p = 0.4$) นอกจากนี้ การนวดแผนไทยยังมี
ผลลดระดับความรู้สึกรู้สึกด้านต่าง ๆ ได้แก่ ความรู้สึกรู้สึกกระตุ้น กังวล
หิว อารมณ์พุ่งสูง หวาดระแวง พุดไม่ออก แยก ขณะถูกกระตุ้นด้วยภาพ
แอลกอฮอล์ ($p < 0.01$) แต่ไม่มีผลต่อความรู้สึกรู้สึกกระสับกระส่าย
นอกจากนี้ การนวดยังมีผลลดระดับ ความดันโลหิต systolic ความดัน
โลหิต diastolic และระดับชีพจร ($p < 0.01$)

- สรุป** : การนวดแผนไทยสามารถลดความอยากแอลกอฮอล์ และสามารถลดระดับความรู้สึกด้านต่าง ๆ และสามารถลดระดับความดันโลหิตและระดับชีพจรได้ ในผู้ติดแอลกอฮอล์ที่ถูกกระตุ้นด้วยภาพแอลกอฮอล์
- คำสำคัญ** : การนวดแผนไทย, ความอยาก, การติดแอลกอฮอล์, ระยะเวลาฟื้นฟู, สถาบันธัญญารักษ์.

Craving refers to the need for substance which results from repetitive use of the substance affecting both physical and mental wellness. As a result, the subjects would have developed a substance seeking behavior.⁽¹⁻⁴⁾ The severity of this depends on the level of craving of particular individuals^(5, 7) or how much they have been addicted to the substance.⁽⁶⁾ Craving level varies depending on the different varieties of the drugs such as cocaine, heroin, cigarette, caffeine and amphetamine.^(7 - 10) Alcohol is also considered one of the strong addictive narcotics resulting in a top death rate of the world population.^(11, 12) It also has been proven that alcohol can stimulate a great deal of craving level.⁽¹³⁾

Currently, researches on alcohol craving have not yet been widely published⁽¹⁴⁾ while the fact that alcohol dependence has been proven significant in Thailand. Based on information provided by Thanyarak Institute, the numbers of alcoholic inpatients in 2009 were 1,047 while the outpatients one was 143.⁽¹⁵⁾ There were 17.6 million American citizens who have been reported alcoholic.⁽¹⁶⁾ In February 2011, the World Health Organization (WHO) reported that 73.6 million of the world population has misused the alcohol while 2.5 million have died from the use of alcohol⁽¹⁶⁾ accounted for 4% of the world population.⁽¹²⁾ Alcohol dependence has also a strong link with violent crimes^(17, 18) resulting in social problems such as divorce and drunk driving.⁽¹⁹⁾ In addition, this also affected health problems including neurocognitive impairment⁽²⁰⁾ and psychosis.⁽²⁾ Alcohol and cigarette are not considered to be an illegal substance⁽²¹⁾ resulted in its wide use^(22, 23) for teenagers and working adults.^(16, 24) Thailand has also been ranked by the WHO as the 5th country in the

world with high rate of liquor consumption.⁽²⁴⁾

Thai traditional massage (TTM) is a local wisdom derived from the ancient time based on the concept of family support. This is for the grandson or granddaughter in the family to massage their grandparents to mitigate soreness and pain and later it has become customary.⁽²⁵⁾ Massage with moderately slight pressure can activate a parasympathetic nervous system⁽²⁶⁾ and also allows an endorphin, a substance to reduce stress level and anxiety as well as to calm the body, to be released. Also, the massage has been proven to alleviate the smoking craving.⁽²⁸⁾

This research was conducted to study the effect of TTM on alcohol dependence subjects for patients at Thanyarak Institute to investigate further its significance and interrelation to enhance future studies on the subject.

Research Methodology

Population and Sample

The subjects in this research were more than 18 years old who had alcohol dependence based on DSM IV (Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition) and Semi-Structured Assessment for Drug Dependence and Alcoholism (SSADDA) Section E. The subjects were in the recovery period and were able to be induced by cues to increase level of alcohol craving. They were capable of reading, writing and understanding Thai language and perfectly conscious. The exclusion criteria were having depression, disorientation, hallucination and having restriction to massage including wound, cancer, skin disease, and having addiction to other narcotic besides alcohol. The research strictly prohibited volunteers to use inhalant and balm or

massage each other from the 1st day to the 5th day of the experiment. Although exclusion criteria did not mention about being female to be excluded from the study, no female subject was screened/included in the study because there was no female subjects at the study site during study period. The researchers conducted a random sampling⁽²⁹⁾ with half of the samples were massaged and another half were asked to read newspapers on the first experiment day. Then, all subjects received the other treatment on the 5th day.

Research Tools

Research tools used in this study are below:

1. Penn Alcohol Craving Scale (PACS) by Flannery and colleagues⁽³⁰⁾ with 5 sets of questions including frequency, intensity, and extremity of alcohol craving as well as the possibility of resistance to drinking in various levels within 1 week was used. The questions comprised of 6 different scales ranging from 0 to 6 with the reliability of 0.92. The researchers translated PACS to Thai language and used it with those who were addicted to volatile matter. The accuracy was verified by the 3 experts and tested with the reliability of 0.83.⁽³¹⁾ The subjects also answered all the questions on the computer themselves.
2. Visual Analog Scale (VAS) to measure the 9 aspects of feeling of before, during and after watching the video of alcohol consumption to stimulate the craving. VAS was adapted from subjective-effect measures by W.J. Lynch and the team.⁽³²⁾ The result from test-retest reliability revealed the stimulated 0.68, anxiety 0.78, hunger 0.70, high 0.70, paranoid 0.75, tongue-tied 0.83, bad 0.66, restless 0.89 and craving 0.69. In addition, the samples completed the

computerized evaluation form of VAS to measure their feelings of all aspects as mentioned above.

As the subjects were hospitalized and were not engaged with any use of alcohol, the researchers therefore performed the experiment with cues exposure to ignite cue-induced substance craving. This method has been proven to effectively stimulate alcohol craving of the subjects. The experimental procedure began with the subjects watching a set of picture video of alcohol consumption as a stimulator for 1 minute x 3 times. After each set of video, the researchers measured the level of craving and feelings based on the said evaluation form as well as to monitor their vital signs. Before the actual implementation, the researchers tested this procedure with the volunteers. Those with 50% increase of alcohol craving level and with PACS score of at least 5 were invited to undertake a full experiment.

Experimental Procedure

The Royal Thai massage or traditional Thai massage (TTM)^(33 - 36) is well known for its remedy effect and relaxation of the body by rubbing 2 sides of the shoulders and 2 spots on the back of the head as well as the 2 spots on the neck. The experimental procedure was conducted with 3 stages in Day 1, Day 2 and Day 5 (Figure 1).

Stage 1: Stimulation of craving with cue (Day 1)

- 1) Subjects were evaluated for their craving level before doing the cue with VAS and PACS as well as the vital signs for 4 minutes.
- 2) The subjects started to watch a set of 12 different pictures of alcohol consumption for 1 minute as a cue for 3 separated times and did the pre-, during and

post evaluation of alcohol craving with VAS and PACS after each set of the pictures. They were also measured their vital signs after watching the picture videos.

3) Subjects then watched a set of 12 different natural view videos for 1 minutes \times 3 times. Their levels of alcohol craving during the time were evaluated with VAS and PACS appeared on the computerized screen after each set of watching natural pictures. Their vital signs were also measured after each set of the pictures.

Stage 2: Experimentation (Day 2)

1) Subjects' feelings and the level of alcohol craving were evaluated through VAS and PACS. Their vital signs were also measured as a pre-test. This step lasted for 4 minutes.

2) Subjects received TTM or read the newspaper for 30 minutes depending or randomly drawn lots.

3) Subjects watched a video of alcohol consumption as a cue and then watch a natural view video. This step was identical to step 2 and 3 in Stage 1.

After this stage subjects had a break for 2 days when no experimentation was conducted on Day 3 and Day 4.

Stage 3: Cross-over experimentation (Day 5)

This stage run in the same manner like stage 2 but changed the subjects who received TTM on Day 2 to reading newspapers on Day 5 and vice versa.

This experimentation has been approved by the Ethics Committee of the Faculty of Medicine, Chulalongkorn University. The researchers realized that the stimulation of alcohol craving might have an impact on the subjects and so watching video on natural views after the experimentation was conducted to ease their anxiety and make them

relaxed. Nevertheless, all subjects had a normal score of craving after 5 minutes once the experiment was completed.

Data Analysis

Primary outcome of the study is level of alcohol craving as measured by PACS and VAS. Secondary outcomes are levels of other feelings, including stimulated, anxious, hungry, high, paranoid, tongue-tied, bad, restless feelings and blood pressure and pulse rate. Descriptive statistics including frequency, percentage, mean, and standard deviation was used for describe general information of the subjects and both primary and secondary outcomes. Data were analyzed by Generalized Estimating Equations (GEE) to determine correlation between outcomes (i.e., activities (TTM), cues (time), subjective feelings (craving, high, anxious, etc.).

Average age of the subjects was 41 ± 8 years (min = 29, max = 55). Out of 18 subjects, 8 (44%) were married, 7 (39%) were single and the rest were divorced (n = 3, 17%). Sixty-one percent of the subjects were graduated with average income from 0 - 15,000 baht. The shortest period of alcohol dependence was 1 year while the highest one was 20 years (mean = 10 years). The last time that the subjects met criteria for alcohol dependence was 5 months (min = 2 months, max = 9 months). The average maximum of drinking within 24 hours was 62 glasses (min = 26, max = 102 glasses).

Score for alcohol craving and the 9 aspects of feeling included the stimulated, anxious, hungry, high, paranoid, tongue-tied, bad, restless and craving as well as vital signs on the day without activity had the highest scores followed by the day with reading newspapers while the day with TTM produced the lowest scores as illustrated in Figure 2.

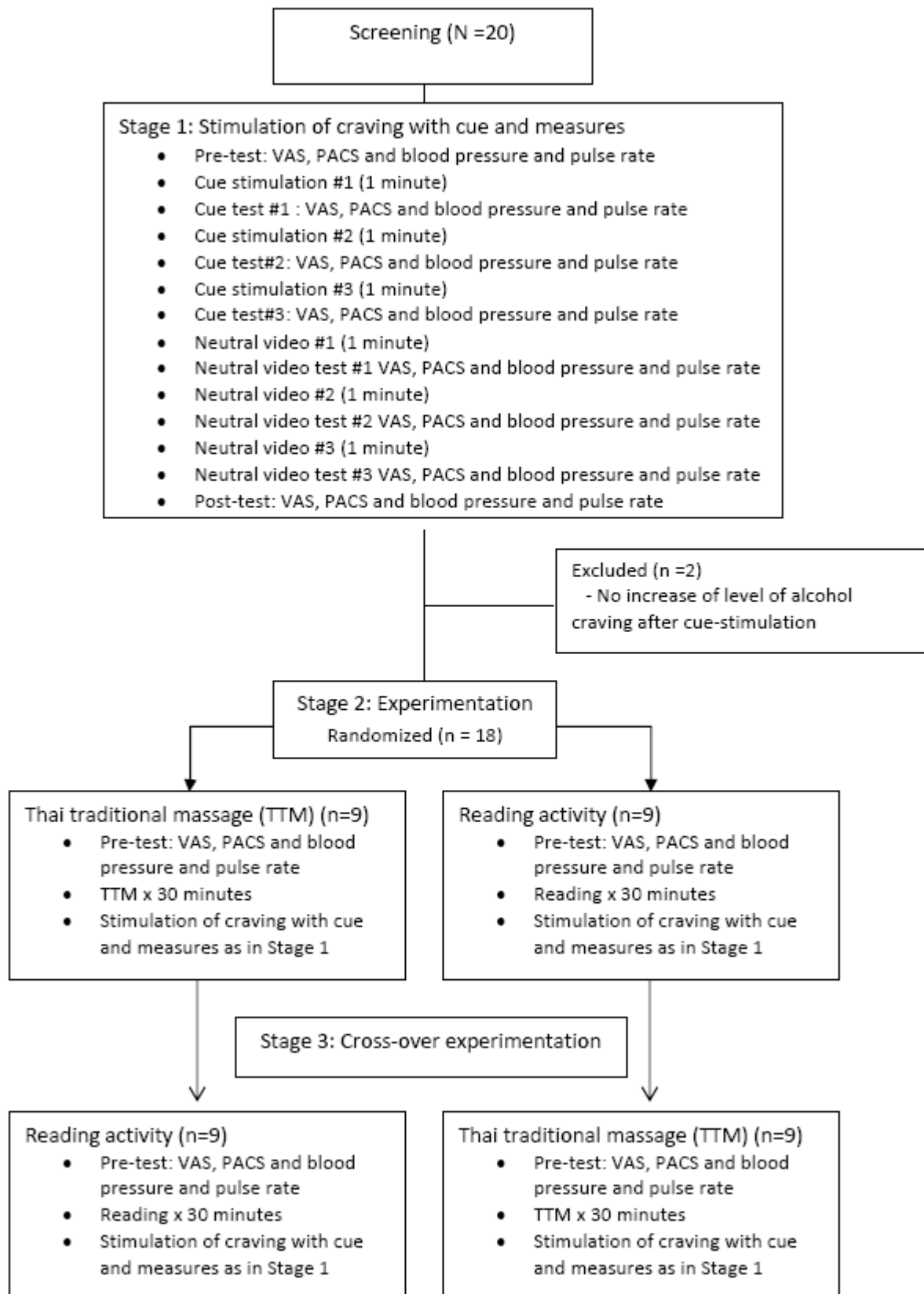


Figure 1. Shows sample size and experiment / measurement in the two treatment arms including Thai traditional massage (TTM) and reading activity. No drop out was observed in the study after beginning experiment but two individuals were excluded before the experiments due to unable to have increase level of alcohol craving after cue stimulation.

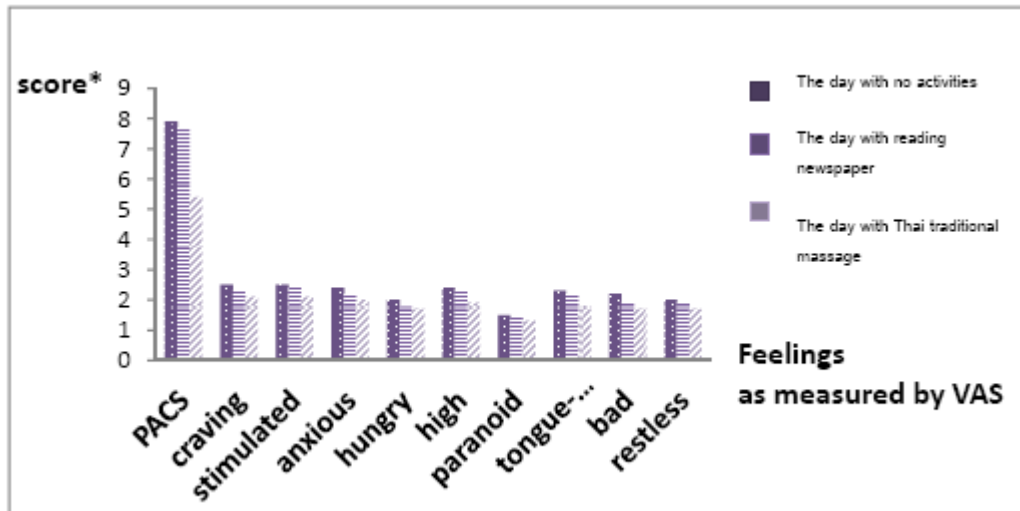


Figure 2. Illustrates average scores for craving and other feelings based on Penn Alcohol Craving Scale (PACS) and Visual Analog Scale (VAS) when watching alcohol cue on the day with Thai traditional massage, the day with reading activity, and the day without any activities. *Full score for PACS is 30 while VAS is 10.

In all the three days, scores of craving level and the 9 aspects of feeling after watching each set of video of alcohol consumption (cue-1, cue-2, cue-3) was higher than those at pre-test and those after watching each set of video of natural view (neutral-1, neutral-2, neutral-3). Score still continued to reduce after the experimentation has completed (post-test) (Table 1).

With respect to vital signs, systolic / diastolic blood pressures and pulse rate after watching each set of video of alcohol consumption (cue-1, cue-2, cue-3) were higher than those at pre-test only in the days with no activities or reading activity. However, on the day receiving TTM, all the vital signs after stimulation by cues were lower than pre-test (Table 2).

According to the analysis based on GEE, significant effects of cues/neutral video ($p < 0.01$; PACS ($B = -0.541$, $S.E.(b) = 0.039$), VAS ($B = -0.263$, $S.E.(b) = 0.017$)) on the level of alcohol craving were

observed. TTM, but not reading newspaper, had a significant effects on reducing alcohol craving ($p < 0.01$; PACS; $B = -1.271$, $S.E.(b) = 0.220$, VAS; $B = -0.299$, $S.E.(b) = 0.098$).

Also based on the analysis of GEE, cue/neutral video had significant effects on the feelings of stimulated, anxious, hungry, high, paranoid, tongue-tied, bad, restless, and systolic and diastolic blood pressures ($p < 0.01$), but not pulse rate. TTM also had a significant effect on reducing the feelings of stimulated, anxious, hungry, high, paranoid, tongue-tied, bad, and systolic / diastolic blood pressures and pulse rate ($p < 0.05$), but not restless feeling. No effect of reading newspaper on any of these feelings and vital signs was observed ($p > 0.05$).

Conclusion and Recommendations

The main purpose of this research was to study the effect of TTM on alcohol craving in those who were stimulated by video cues of alcohol

Table 1. Average and standard deviation of the alcohol craving score and the 9 aspects of feeling as a function of time on the day with Thai traditional massage, the day with reading activity, and the day without any activities.

	Pre-test Mean \pm SD	Cue-1 Mean \pm SD	Cue-2 Mean \pm SD	Cue-3 Mean \pm SD	Neutral-1 Mean \pm SD	Neutral-2 Mean \pm SD	Neutral-3 Mean \pm SD	Post-test Mean \pm SD
Alcohol craving (PACS) score = 30								
Day with no activities	4.2 \pm 1.4	7.3 \pm 1.1	7.7 \pm 1.0	8.6 \pm 1.0	4.8 \pm 1.4	4.5 \pm 1.2	3.8 \pm 1.3	1.7 \pm 0.9
Day with TTM	4.1 \pm 1.6	4.9 \pm 1.9	5.5 \pm 2.0	5.8 \pm 2.3	4.0 \pm 1.6	3.7 \pm 1.5	3.2 \pm 1.2	1.3 \pm 1.2
Day with reading	4.3 \pm 1.3	7.2 \pm 1.5	7.5 \pm 1.0	8.5 \pm 0.9	4.5 \pm 1.2	4.1 \pm 1.2	3.5 \pm 1.2	1.5 \pm 0.9
-Craving								
Day with no activities	2.3 \pm 0.6	2.5 \pm 0.5	2.4 \pm 0.7	2.6 \pm 1.0	1.6 \pm 0.5	1.2 \pm 0.5	1.1 \pm 0.7	0.5 \pm 0.6
Day with TTM	1.9 \pm 0.6	2.1 \pm 0.8	2.0 \pm 1.5	2.1 \pm 1.2	1.4 \pm 1.0	1.1 \pm 0.4	0.8 \pm 0.4	0.3 \pm 0.5
Day with reading	2.1 \pm 0.5	2.2 \pm 0.9	2.4 \pm 1.4	2.3 \pm 1.3	1.5 \pm 1.2	1.2 \pm 0.6	1.1 \pm 0.3	0.4 \pm 0.5
-Stimulated								
Day with no activities	2.2 \pm 0.7	2.7 \pm 0.5	2.3 \pm 1.0	2.5 \pm 1.2	1.5 \pm 0.6	1.1 \pm 0.2	1.0 \pm 0.0	0.5 \pm 0.5
Day with TTM	1.9 \pm 0.6	2.1 \pm 1.0	2.0 \pm 0.8	2.2 \pm 0.8	1.2 \pm 0.6	0.9 \pm 0.4	0.7 \pm 0.5	0.2 \pm 0.4
Day with reading	2.1 \pm 0.4	2.5 \pm 1.0	2.2 \pm 0.7	2.3 \pm 0.8	1.4 \pm 0.8	1.0 \pm 0.3	0.9 \pm 0.4	0.3 \pm 0.5
-Anxious								
Day with no activities	2.1 \pm 0.7	2.2 \pm 0.7	2.4 \pm 0.7	2.5 \pm 1.3	1.4 \pm 0.9	0.8 \pm 0.7	0.7 \pm 0.5	0.5 \pm 0.5
Day with TTM	1.8 \pm 0.6	1.9 \pm 0.6	2.0 \pm 1.1	2.1 \pm 1.0	1.1 \pm 0.7	0.6 \pm 0.5	0.4 \pm 0.5	0.3 \pm 0.5
Day with reading	2.0 \pm 0.7	2.1 \pm 0.8	2.2 \pm 1.0	2.3 \pm 0.8	1.2 \pm 0.9	0.7 \pm 0.7	0.5 \pm 0.5	0.3 \pm 0.5
Hungry								
Day with no activities	1.5 \pm 0.7	2.3 \pm 0.7	1.9 \pm 0.9	1.7 \pm 0.6	1.1 \pm 0.7	0.8 \pm 0.4	0.6 \pm 0.5	0.4 \pm 0.5
Day with TTM	1.3 \pm 0.7	1.8 \pm 0.6	1.5 \pm 1.4	1.9 \pm 0.7	0.9 \pm 0.4	0.6 \pm 0.5	0.4 \pm 0.5	0.3 \pm 0.5
Day with reading	1.4 \pm 0.7	2.1 \pm 0.3	1.7 \pm 1.1	1.5 \pm 0.6	1.0 \pm 0.6	0.7 \pm 0.6	0.5 \pm 0.5	0.3 \pm 0.5
High								
Day with no activities	2.2 \pm 0.7	2.4 \pm 0.7	2.5 \pm 1.2	2.3 \pm 0.6	1.4 \pm 0.6	1.2 \pm 0.8	0.7 \pm 0.5	0.4 \pm 0.5
Day with TTM	1.7 \pm 0.7	1.8 \pm 0.8	1.9 \pm 1.2	1.8 \pm 0.7	1.2 \pm 0.4	1.0 \pm 0.5	0.5 \pm 0.5	0.2 \pm 0.4
Day with reading	2.1 \pm 0.5	2.2 \pm 0.8	2.4 \pm 0.9	2.2 \pm 0.7	1.3 \pm 0.5	1.1 \pm 0.7	0.6 \pm 0.5	0.3 \pm 0.5
-Paranoid								
Day with no activities	1.2 \pm 0.4	1.3 \pm 0.5	1.7 \pm 1.0	1.7 \pm 0.7	1.3 \pm 0.7	0.9 \pm 0.7	0.6 \pm 0.6	0.4 \pm 0.5
Day with TTM	1.1 \pm 0.8	1.4 \pm 1.0	1.2 \pm 1.2	1.3 \pm 0.7	0.8 \pm 0.8	0.6 \pm 0.5	0.4 \pm 0.5	0.3 \pm 0.5
Day with reading	1.2 \pm 0.7	1.3 \pm 0.8	1.5 \pm 1.2	1.4 \pm 1.0	1.2 \pm 0.8	0.7 \pm 0.5	0.5 \pm 0.5	0.4 \pm 0.5
-Tongue-tied								
Day with no activities	2.0 \pm 0.6	2.4 \pm 1.2	2.2 \pm 0.9	2.3 \pm 0.9	1.6 \pm 0.9	1.4 \pm 0.7	0.8 \pm 0.5	0.5 \pm 0.6
Day with TTM	1.6 \pm 0.7	1.9 \pm 1.0	1.7 \pm 0.8	1.8 \pm 0.9	1.4 \pm 0.7	1.1 \pm 0.3	0.6 \pm 0.5	0.3 \pm 0.5
Day with reading	1.8 \pm 0.6	2.2 \pm 1.0	2.1 \pm 0.7	2.3 \pm 0.9	1.5 \pm 0.8	1.3 \pm 0.7	0.7 \pm 0.5	0.4 \pm 0.5
Bad								
Day with no activities	1.8 \pm 0.6	2.2 \pm 1.0	2.1 \pm 0.7	2.3 \pm 0.9	1.5 \pm 0.8	1.3 \pm 0.7	0.7 \pm 0.5	0.4 \pm 0.5
Day with TTM	1.5 \pm 0.7	1.8 \pm 0.8	1.7 \pm 0.9	1.6 \pm 0.8	1.1 \pm 0.5	0.9 \pm 0.2	0.5 \pm 0.5	0.2 \pm 0.4
Day with reading	1.6 \pm 0.7	1.9 \pm 0.8	1.8 \pm 0.8	2.1 \pm 1.0	1.2 \pm 0.9	1.0 \pm 0.6	0.6 \pm 0.6	0.3 \pm 0.5
-Restless								
Day with no activities	1.5 \pm 0.6	1.8 \pm 0.6	2.2 \pm 0.9	1.9 \pm 0.7	1.5 \pm 0.6	0.9 \pm 0.6	0.8 \pm 0.6	0.3 \pm 0.5
Day with TTM	1.5 \pm 0.7	1.6 \pm 1.0	1.8 \pm 0.9	1.7 \pm 1.0	1.4 \pm 0.6	0.9 \pm 0.6	0.6 \pm 0.5	0.2 \pm 0.4
Day with reading	1.6 \pm 0.7	1.9 \pm 1.2	2.0 \pm 0.8	1.8 \pm 0.8	1.5 \pm 0.9	0.8 \pm 0.6	0.7 \pm 0.5	0.4 \pm 0.5

Table 2. Average and standard deviation of systolic and diastolic blood pressure and pulse rate as a function of time on the day with Thai traditional massage, the day with reading activity, and the day without any activities.

	Pre-test Mean ± SD	Cue-1 Mean ± SD	Cue-2 Mean ± SD	Cue-3 Mean ± SD	Neutral-1 Mean ± SD	Neutral-2 Mean ± SD	Neutral-3 Mean ± SD	Post-test Mean ± SD
Vital signs								
-Systolic blood pressure								
Day with no activities	116.6 ± 4.8	119.7 ± 4.9	120.7 ± 5.1	122.9 ± 5.5	119.6 ± 5.1	117.7 ± 5.0	116.4 ± 4.9	116.8 ± 4.6
Day with massage	120.4 ± 3.6	115.6 ± 4.4	115.3 ± 5.1	115.2 ± 4.9	114.6 ± 5.1	114.2 ± 4.2	113.9 ± 4.2	113.4 ± 4.6
Day with newspaper	115.9 ± 4.7	118.6 ± 5.3	118.8 ± 4.7	121.2 ± 5.7	119.9 ± 2.8	118.3 ± 2.8	118.0 ± 2.6	115.6 ± 5.0
-Diastolic blood pressure								
Day with no activities	76.6 ± 5.5	76.7 ± 6.4	76.1 ± 6.3	77.1 ± 5.7	75.7 ± 6.1	75.4 ± 7.1	74.5 ± 5.9	74.3 ± 6.4
Day with massage	75.1 ± 5.0	74.4 ± 4.6	73.5 ± 5.4	72.9 ± 5.0	72.8 ± 4.1	71.9 ± 3.8	71.3 ± 5.2	71.0 ± 4.0
Day with newspaper	73.8 ± 6.1	74.6 ± 5.5	75.4 ± 5.5	75.5 ± 5.7	77.0 ± 5.1	75.2 ± 6.3	76.6 ± 3.7	74.2 ± 6.2
-Pulse rate								
Day with no activities	68.5 ± 8.0	70.1 ± 6.3	70.3 ± 6.8	70.6 ± 6.9	68.4 ± 7.7	68.3 ± 6.5	68.2 ± 8.1	68.1 ± 6.3
Day with massage	69.8 ± 6.7	67.1 ± 6.6	66.2 ± 6.5	66.6 ± 8.4	66.5 ± 6.8	66.4 ± 7.6	65.8 ± 8.0	65.7 ± 7.2
Day with newspaper	65.8 ± 8.0	67.7 ± 9.2	67.9 ± 8.9	68.6 ± 10.8	69.6 ± 9.5	69.1 ± 6.8	69.4 ± 8.1	66.8 ± 6.9

consumption. The alcohol cues used in this study could successfully induce alcohol craving, consistent with previous studies of drug-induced craving^(40 - 43), and activate several aspects of the feeling and systolic and diastolic blood pressures, but not pulse rate. The study revealed that TTM could reduce cue-induced alcohol craving. It also reduced several aspects of the feeling including stimulated, anxious, hungry, high, paranoid, tongue-tied, bad, and vital signs such as systolic and diastolic blood pressures. This was true except for the case of restlessness which TTM had no effect on it.

The massage procedure mainly involves touching. Touching affects the level of hormone through tactile receptors that connect to myelinated or non-myelinated tactile neurons. This also linked with parts of the brain called insular and limbic system.^{(44,}

⁴⁵⁾ Massage is assumed to produce similar outcome

like touching which affects the emotion and feeling through free nerve ending, hair end organ, and Pacinian corpuscle which are stimulated by the movement of the nerve and thus creating a small delta type A called anterolateral pathway to ultimately reach the part of brain called cortex, insular and limbic system.^(44 - 46) The massage with moderately slight pressing activates parasympathetic nervous system making relaxation of the body and mind.

Alcohol is a central nervous system (CNS) depressant with an effect on glutamatergic neurotransmission particularly NMDA receptor and endogenous opioid neuropeptides as part of the reinforcement effect which also relates to GABA receptor.⁽²⁾ Therefore, the effect of massage and alcohol consumption yield similar result that they both relax the body and the mind. However, when a person has craving for alcohol, sympathetic nervous system

is activated. Previous studies also reported an increase of blood pressure, heart rate, and cerebral blood flow in limbic system of individuals who were watching video cues that induced craving for drug.⁽³⁷⁻³⁹⁾ Alcohol craving also related to other negative responses including insomnia, soreness, dizziness, aggressive behavior, depressed feeling, and anxiety which might be mitigated by massage.⁽⁴⁷⁻⁶⁷⁾ Applying massage, an activity that has a calming effect, in persons who were stimulated by alcohol cues, may reduce craving and other responses via activating parasympathetic nervous system. However, mechanism of the effect of TTM to ease alcohol craving required further investigation.

Surprisingly, the study revealed that watching alcohol cues could induce positive feeling, including "high" or euphoria which was also reduced by TTM. It might be possible that TTM might have a normalized effect since it could reduce both positive (i.e., high) and negative (i.e., anxious, bad) feelings. However, further investigation of the effect of alcohol cue and TTM on this positive affect is needed before making further conclusion.

Several limitations deserve mentioned. With sample of 18 subjects, this research would be much accurate if the number could be increased. In addition, the study did not include female samples since there was no female subject during study duration. However, previous research has indicated that females could be stimulated with cues to have craving more than males.⁽⁶⁸⁾ Finally, this study only focused on subjects on the recovery period and so the result might not be best to minify the outcomes. Future study is to involve female subjects and subject at various stage of treatment or at other institutions to be able to generalize the results to general population.

In summary, this research has revealed the fact that TTM could mitigate craving level while the subjects were watching video of alcohol consumption and thus affecting the stimulated, anxious, hungry, high, paranoid, tongue-tied, bad feelings. The finding from this research provides an insight for non-pharmacological treatment of TTM for alcohol dependence and offers improvement in the treatment for symptoms related to alcohol addiction leading to better rehabilitation and thus promoting better quality of life. The study also confirmed a strong stimulation effect of inducing craving from watching an alcohol cues. Therefore, avoiding alcohol cues in persons with alcohol problems is highly recommended to avoid craving for drinking.

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References

1. National Drug And Alcohol Abuse Helpline. Drug cravings [online].2011 [cited 2012 Mar 27] Available from: <http://www.drug-rehabs.org/drug-cravings.htm>
2. Department of Psychiatry faculty of Medicine. Alcohol-related disorders. In: Human Behavior & Mental Disorders. 2nd edition. Bangkok: Chulalongkorn University Printing 2004:184-99
3. Drummond DC. Theories of drug craving, ancient and modern. *Addiction* 2001 Jan; 96(1): 33-46
4. Robisson TE, Berridge KC. The neural basis of drug craving: an incentive-sensitization theory of addiction. *Brain Res Brain Res Rev* 1993 Sep;18(3): 247-91
5. Miyata H, Yanagita T. Neurobiological mechanisms of nicotine craving. *Alcohol* 2001 Jun; 24(2): 87-93
6. Da Silveira DX, Doering-Silveira E, Niel M, Jorge MR. Predicting craving among cocaine users. *Addict Behav* 2006 Dec; 31(12): 2292-7
7. Tziortzis D, Mahoney JJ 3rd, Kalechstein AD, Newton TF, De la Garza R 2nd. The relationship between impulsivity and craving in cocaine-and methamphetamine-dependent volunteers. *Pharmacol Biochem Behav* 2011 Apr; 98(2): 196-202
8. Epstein DH, Marrone GF, Heishman SJ, Schmittner J, Preston KL. Tobacco, cocaine and heroin: Craving and use during daily life. *Addict Behav* 2010 Apr; 35(4): 318-24
9. Sayette MA, Martin CS, Wertz JM, Perrott MA, Peters AR. The effects of alcohol on cigarette craving in heavy smokers and tobacco chippers. *Psychol Addict Behav* 2005 Sep; 19(3): 263-70
10. Griffiths RR, Evans SM, Heishman SJ, Preston KL, Sannerud CA, Wolf B, Woodson PP. Low-dose caffeine physical dependence in humans. *J Pharmacol Exp Ther* 1990 Dec; 255(3): 1123-32
11. Alcohol Abuse Center. Some General Statistics from Substance Abuse Resources [online]. 2011 [cited 2012 Mar 27]. Available from: <http://www.alcoholabusecenter.com/some-general-statistics-from-substance-abuse-resources/>
12. Newsmaxhealth. Health Stories [online]. 2011 [cited 2012 Mar 27]. Available from: http://www.news-maxhealth.com/healthstories/WHO_Alcohol_Report/2011/02/11/375545.html
13. Papachristou H, Nederkoorn C, Havermans R, van der HM, Jansen A. Can't stop the craving: the effect of impulsivity on cue-elicited craving for alcohol in heavy and light social drinkers. *Psychopharmacology (Berl)* 2012 Jan; 219(2): 511- 8
14. Simpson TL, Stappenbeck CA, Varra AA, Moore SA, Kaysen D. Symptoms of Posttraumatic Stress Predict Craving Among Alcohol Treatment Seekers: Results of a Daily Monitoring Study. *Psychol Addict Behav* 2012 Feb; PMID:22369221
15. Thanyarak Institute. The Numbers and

- percentage of inpatients and outpatients of Thanyarak Institute [online].2010 [cited 2010 Nov 12]. Available from: http://www.thanyarak.go.th/thai/index.php?option=com_content&task=view&id=1041&Itemid=53
16. Compassinterventions. Alcoholism & Drug Addiction Statistics [online]. 2011 [cited 2012 Mar 27]. Available from: <http://www.compassinterventions.com/alcohol-drug-statistics.html>
 17. Day P, Breetzke G, Kingham S, Campbell M. Close proximity to alcohol outlets is associated with increased serious violent crime in New Zealand. *Aust N Z J Public Health* 2012 Feb;36(1):48-54
 18. Rowe S, Wiggers J, Kingsland M, Nicholas C, Wolfenden L. Alcohol consumption and intoxication among people involved in police-recorded incidents of violence and disorder in non-metropolitan New South Wales. *Aust N Z J Public Health* 2012 Feb;36(1):33-40
 19. Bohning D, Na-Ayuthaya RS. A case- control study of non-fatal traffic accidents on hospital patients in Bangkok metropolis. *Soz Praventivmed* 1997;42(6):351-7
 20. Sanhueza C, Garcia-Moreno LM, Exposito J. Weekend alcoholism in youth and neurocognitive aging. *Psicothema* 2011 Apr; 23(2): 209-14
 21. Narcotics Prevention Association, Ministry of Public Health. Narcotics Prevention of Local Public Health Authorities 2002. Bangkok: The War Veterans Organization Publication, 2003.
 22. Lichine A. Alexis Lichine's New Encyclopedia Of Wines & Spirits. 5th ed. New York: Alfred A. Knopf; 1987: 707-9
 23. Phassakorn. Alcohol [online]. 2010 [cited 2010 Nov 12]. Available from: <http://www.academy.chs.ac.th/academy/physical/PHASSAKORN/druck.htm>
 24. Department of Mental Health. Alcohol Consumption Ranking by World Health Organization [online]. 2011 [cited 2012 Mar 27]. Available from: <http://www.dmh.go.th/>
 25. The Institute of Thai Traditional Medicine, Department of Development of Thai Traditional and Alternative Medicine, Ministry of Public Health. Healthy Guidelines with Thai Traditional Medicine. Bangkok: The War Veterans Organization of Thailand under Royal Patronage of His majesty the King Publication, 2004
 26. Diego MA, Field T. Moderate pressure massage elicits a parasympathetic nervous system response. *Int J Neurosci.* 2009;119(5): 630-8
 27. The Riva Spa. Thai Traditional Massage. [Online]. 2010 [cited 2010 Nov 12]. Available from: <http://www.therivaspa.com/treatment.html>
 28. Supprasert P, Channak S, Nantanon S, Srisomboon R, Prayong T, Mongkolsri U. Effect of the temple massage on stress reduction and craving smoking in Male students smoker of Huachiew Chalermprakiet University age between 18 – 25 years. Bangkok: Research of Faculty of Physical Therapy Huachiew Chalermprakiet University, 2550
 29. Medical Research Center, Faculty of Medicine

- Chulalongkorn University. Guidelines for effective research. 5th ed. Bangkok: Text and Journal Publication, 2007
30. Flannery BA, Volpicelli JR, and Pettinati HM. Psychometric properties of the Penn Alcohol Craving Scale. *Alcohol Clin Exp Res* 1999 Aug;23(8):1289-95
31. Maneesang W. Effect of aromatherapy on craving response in individuals receiving inhalants substance-dependency treatment at Thanyarak Institute [thesis]. Bangkok: Chulalongkorn University, 2010
32. Lynch WJ, Sughondhabirom A, Pittman B, Gueorguieva R, Kalayasiri R, Joshua D, Morgan P, Coric V, Malison RT. A Paradigm to investigate the regulation of cocaine self-administration in human cocaine users: a randomized trial. *Psychopharmacology (Berl)* 2006 Apr;185(3):306-14
33. The Institute of Thai Traditional Medicine, Office of the Permanent Secretary for Public Health, Ministry of Public Health. Traditional Thai Massage and Stress Reduction. *Traditional Thai Medicine Journal* 2001;5(5): 49
34. Association for the Promotion of Traditional Medicine, School of Medical Science. Thai Traditional Therapeutic Massage (Royal Thai Massage). Bangkok: Genesh Printing Center, 2005
35. The Institute of Thai Traditional Medicine, Department of Medical Service, Ministry of Public Health. Theory of Traditional Thai Massage. Bangkok: War Veterans Organization of Thailand under Royal Patronage of His majesty the King Publication, 1995
36. Thai Pun Traditional Thai and Chinese Medicine. Shoulder and neck massage [online]. 2010 [cited 2010 Dec 8]. Available from: http://thaipun.com/index.php?option=com_content&view=category&id=43&Itemid=112
37. Childress AR, Mozley PD, McElgin W, Fitzgerald J, Reivich M, O'Brien CP. Limbic Activation during cue-induced cocaine craving. *Am J Psychiatry* 1999 Jan;156(1):11-8
38. Wang GJ, Volkow ND, Fowler JS, Cervany P, Hitzemann RJ, Pappas NR, Wong CT, Felder C. Regional brain metabolic activation during craving elicited by recall of previous drug experiences. *Life Sci* 1999; 64(9):775-84
39. Garavan H, Pankiewicz J, Bloom A, Cho JK, Sperry L, Ross TJ, Salmeron BJ, Risinger R, Kelley D, Stein EA. Cue-induced cocaine craving: neuroanatomical specificity for drug users and drug stimuli. *Am J Psychiatry* 2000 Nov;157(11):1789-98
40. Streeter CC, Gulliver SB, Baker E, Blank SR, Meyer AA, Ciraulo DA, Renshaw PF. Videotaped cue for urge to drink alcohol. *Alcohol Clin Exp Res* 2002 May;26(5):627-34
41. Shadel WG, Niaura R, Abrams DB. Effect of different cue stimulus delivery channels on craving reactivity: comparing in vivo and video cues in regular cigarette smokers. *J Behav Ther Exp Psychiatry* 2001 Dec;32(4): 203-9
42. Culbertson C, Nicolas S, Zaharovits I, London ED, De la Garza R 2nd, Brody AL, Newton TF.

- Methamphetamine craving induced in an online virtual reality environment. *Pharmacol Biochem Behav* 2010 Oct; 96(4):454-60
43. Ren ZY, Zhang XL, Liu Y, Zhao LY, Shi J, Bao Y, Zhang XY, Kosten TR, Lu L. Diurnal variation in cue-induced responses among protracted abstinent heroin users. *Pharmacol Biochem Behav* 2009 Jan; 91(3):468-72
44. Olausson H, Lamarre Y, Backlund H, Morin C, Wallin BG, Starck G, Ekholm S, Strigo I, Worsley K, Vallbo AB, et al. Unmyelinated tactile afferents signal touch and project to insular cortex. *Nat Neurosci* 2002 Sep;5(9): 900-4
45. Amen DG. Brain Function and Physiology. Limbic System (controls mood and attitude) [online]. 2011 [cited 2012 Mar 27]. Available from: <http://www.brainplace.com/bp/Brainsystem/limbic.asp>
46. Sudsuang R. Sensory nervous system. In: Sudsuang R, Singhaniyom V, eds. *Neurophysiology*. 4th ed. Bangkok: Text and Journal Publication, 2002:197-223
47. Lhesook R. Effects of providing health information combined with reflexology on insomnia, fatigue, and depression in patients with chronic kidney disease [thesis]. Bangkok: Chulalongkorn University, 2006
48. Jane SW, Chen SL, Wilkie DJ, Lin YC, Foreman SW, Beaton RD, Fan JY, LuMY, Wang YY, Lin YH, et al. Effects of massage on pain, mood status, relaxation, and sleep in Taiwanese patients with metastatic bone pain: a randomized clinical trial. *Pain* 2011 Oct;152(10):2432-42
49. Saejiaw A. The effect of symptom management by thaiherb-ball compression on fatigue of mothers during postpartum [thesis]. Bangkok: Chulalongkorn University, 2004
50. Boonyapo W. Effectiveness of foot massage in reducing muscular fatigue and fatigued feeling in prolonged standing workers [thesis]. Bangkok: Mahidol University, 2002
51. Tumwijit S. The effect of symptom management with aromatherapy massage program on fatigue in breast cancer patients after mastectomy undergoing chemotherapy [thesis]. Bangkok Chulalongkorn University, 2004
52. Kasedluksame S. The effect of preoperative information combined with foot reflexology with aromatherapy on unpleasant symptoms in post opened-heart surgery patients [thesis]. Bangkok: Chulalongkorn University, 2005
53. Chainakin P. Effect of hand reflexology on nausea, retching and vomiting in cancer patients receiving chemotherapy [thesis]. Bangkok: Mahidol University, 2005
54. Ferner T, Lively B, Arondekar B, Black C. Massage helps control nausea and vomiting in chemotherapy patients [online] 2010 [cited 2012 Mar 27]. Available from: http://www.massagetoday.com/pdf_files/graphs/aug_03graph.pdf
55. Agren A, Berg M. Tactile massage and severe nausea and vomiting during pregnancy-women's experiences. *Scand J Caring Sci* 2006 Jun;20(2):169-76
56. Khanman S. The effects of foot massage as a

- complementary nursing intervention on numbness in non-insulin dependent diabetes mellitus patients [thesis]. Bangkok: Mahidol University, 2001
57. Thuma K. Immediate effects of foot massage on decrease foot paresthesia in patients with non-insulin dependent diabetes mellitus [thesis]. Khon Kaen: Khon Kaen University, 2007
58. von Knorring AL, Soderberg A, Austin L, Uvnas-Moberg K. Massage decreases aggression in preschool children: a long-term study. *Acta Paediatr* 2008 Sep; 97(9): 1265-9
59. Diego MA, Field T, Hernandez-Reif M, Shaw JA, Rothe EM, Castellanos D, Mesner L. Aggressive adolescents benefit from massage therapy. *Adolescence* 2002; 37(147):597-607
60. Fakmanee S. The effect of reflexology on the reduction of anxiety and symptom distress in breast cancer patients receiving chemotherapy [thesis]. Bangkok: Mahidol University, 2001
61. Promtingkran N. Effect of foot massage on anxiety reduction among patients in surgical critical care unit [thesis]. Chiang Mai: Chiang Mai University, 2002
62. Pisankosakul S. A comparison of the acute effect of Thai royal massage, Thai private massage, and a combined method on anxiety of the elderly [thesis]. Bangkok: Chulalongkorn University, 2006
63. Muangnil P. Effect of aroma oil massage on depression state in older adults [thesis]. Bangkok: Mahidol University, 2006
64. Field T, Diego M, Hernandez-Reif M, Medina L, Delgado J, Hernandez A. Yoga and massage therapy reduce prenatal depression and prematurity. *J Bodyw Mov Ther* 2012 Apr; 16(2):204-9
65. Nicharoj L, Wimuktalop P, Paichue N. Effect of foot massage on stress and blood pressure reduction. *Thai Traditional and Alternative Medicine Journal* 2008 May-August;6(2):61
66. Howangsuwannakorn S. Effects of foot reflexology on pain level, vital signs, and satisfaction in post-abdominal surgical patients [thesis]. Bangkok: Mahidol University, 2003
67. Nakakej M, Aungpinitpong W. Effect of Private Thai Massage on stress and relaxation. *Thai Traditional and Alternative Medicine Journal* 2007 May-August;5(2):5
68. Whitten L. Men and women may process cocaine cues differently. *NIDA NOTES* 2004 Dec; 19(4):4-5