# Randomized Controlled Trial of Computerized Cognitive Behavioral Therapy Program for Adolescent Offenders with Depression

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**Abstract:** Depression affects the lives of young offenders and requires treatment. However, too few therapists, high service costs, and stigma are barriers preventing them from accessing mental health services in many countries. Although, computer-assisted psychotherapy has been proven a revolutionary intervention for reducing depression and enhancing accessibility, it has not been used for depressed youths with delinquency problems both in Thailand and abroad. This randomized control trial investigated the effectiveness of the Computerized Cognitive Behavioral Therapy program for reducing depression among youths with delinquency problems. The youths in a juvenile vocational training center in northern Thailand who met the inclusion criteria were randomly assigned into an experimental group receiving the program in addition to usual activities, while the control group received only the usual activities (n=42 per group). Depression was measured using the Thai Patient Health Questionnaire before the program started, then 1 and 2 months after the intervention. Repeated measure ANOVA, and independent t-test were used to test the program efficacy. Results revealed that participants in the experimental group after entering the program, and 1 and 2 months after the intervention had significantly lower mean scores of depression than before receiving the program. Additionally, they had a significantly lower mean score of depression than that of the control group immediately after completing the program. The findings indicated that the CCBT program can reduce depression among youths with delinquency problems. Nurses should integrate this program as a depression intervention for youths in this group. However, further study is needed for examining the sustainability of the long term impacts of the program in reducing depression.

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## Introduction

Depression is a critical problem among juvenile delinquents worldwide,[1] including Thailand.[2] More than 50-80% of Thai youths with delinquency problems show mild-to-moderate depression.[2] Depression affects their daily life and social relationships[3] and leads to behavioral problems after they return home to the community.[3] Several studies in countries including

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Thailand indicate that cognitive distortion or negative automatic thoughts (NATs) were the most significant causes of depression in youths with delinquency problems.[4-6] These cognitive patterns make adolescents think negatively about themselves, the world, and the future when faced with a stressful life event.[4,5] Hence, reducing depression among youths with delinquency problems should focus on modifying their NATs.

Cognitive Behavioral Therapy (CBT) based on the Cognitive Theory of Depression postulates that individual's interpretation of negative life events plays a role in the experience of depression.[7] Although previous studies indicated that CBT has been useful for the modification of the negative thinking that causes depression among youths with delinquency problems[4,5] the large number of depressed youth with delinquency problems, the limited number of well-trained therapists, and the reluctance of youth to enter traditional psychotherapy because of stigma, are significant factors preventing them from using face-to-face CBT.[8]

Recently, Computerized Cognitive Behavioral Therapy (CCBT) has been reported as an effective treatment for depression that can reduce barriers and increase accessing to CBT.[9] However, no research to date has been conducted related to reducing depression among Thai youths with delinquency problems using CCBT. This experimental study, therefore, aimed to determine the effectiveness of the CCBT program in reducing depression in youths with delinquency problems. It was hypothesized that the youths with delinquency problems who participated in the CCBT program would report the following:

1. Significantly lower depression scores than those receiving only usual activities after completing the program, a 1-month follow-up, and a 2-month follow-up after the intervention.

2. Significantly lower depression scores immediately after completing the program, and after a 1-month follow-up and a 2-month follow-up than before receiving the program.

## Review of Literature

CBT is a form of psychotherapy that can be offered as a self-help intervention with or without support from a CBT therapist or a trained professional such as a general practitioner, nurse, or community coach by making telephone calls, sending emails, or posting comments during a personal conference. CCBT refers to a number of methods of delivering CBT via a computer interface with patients to make psychotherapy.[10] It is a feasible, flexible, and highly accessible treatment in a non-stigmatizing environment that can be delivered in a variety of settings. Literature indicate that supported CCBT interventions have higher rates of adherence and positive outcomes.[11] It is an effective and acceptable treatment for depression, particularly adolescent depression.[12] A systematic review using ten randomized controlled trials reported that CCBT could reduce clinical depressive symptoms and improve cognition, self-esteem, and appropriate behavior.[13] In addition, the result of a meta-analysis to evaluate the effectiveness of CCBT in treating the symptoms of anxiety and depression using 13 randomized trials of 796 children and adolescents showed the efficacy of CCBT in the treatment of anxiety and depressive symptoms.[14]

Although there have been several CCBT programs for reducing depression,[15] there are limitations for their application in the treatment of depression among youths with delinquency problems.[16] Thus, it is necessary to develop an effective CCBT program for reducing depression among youths in the detention center who have a different context and have limitations accessing traditional CBT, particularly Thai youths with delinquency problems. This study, using Cognitive Theory as the theoretical framework and Cognitive Behavioral Therapy as the method of intervention via the computer, involved the construction and investigation of the effectiveness of a CCBT program for reducing depression among youth in the juvenile vocational training center.

## Method

***Design:*** A single-blind randomized block design with repeated measures was used in the study.

***Ethical consideration:*** Study approval was received from the Ethical Committee of Faculty of Nursing, Chiang Mai University, the director of the Department of the Ministry of Justice and the director of the study site. All participants gave written consent after they received explanations about the purpose of the study, procedures, and their right to confidentiality, and anonymity. They were also informed about their right to withdraw from the study at any time without negative repercussions.

***Setting and sample:*** The study was conducted from April 2014 to July 2015. Inclusion criteria were: Being a youth with delinquency problems aged between 14-18 years at the day of offending; incarcerated in the vocational training center in Northern Thailand for longer than 6 months; receiving a score of 9-19 on the Thai version of the Patient Health Questionnaire (PHQ-9); not taking antidepressant drugs; no serious mental illness affecting cognitive function; had basic computer literacy; able to communicate in the Thai language, and willing to participate in this study. The exclusion criteria were: having signs and symptoms of substance abuse, and undergoing another psychotherapy or CBT. The discontinuation criteria included: being discharged from incarceration before completing the program, being transferred to another juvenile vocational training center, and changing the treatment plan.

The sample size was estimated using power analysis in order to reduce the risk of type II error.[17] The accepted minimum level of significance ($\alpha$) to estimate the number of sample size was .05 with the power of .80 ($1-\beta$). The effect size ranges from .20 to .40 was the conventional standard for most nursing studies.[18] Therefore, the sample size in this study was determined based on the criteria of the significance level of .05, power of .80, and effect size of .40. The sample size required was 72 participants. Inordinate dropout of participants was prevented by adding 15% more participants,[19] giving a total of 83. Additionally, permuted-block randomization (block size=4) was used to ensure balance. Block randomization functions by randomizing participants within blocks such that an equal number are assigned to each treatment. One of six possible ways (TTCC, CCTT, TCTC, CTCT, TCCT, CTTC) was randomly selected and the each 2 participants were assigned to the experimental group and the control group. Therefore, 21 blocks of 4 participants were used, including 84 youths with delinquency problems, with 42 in each group.

The principal investigator (PI) assessed 312 youths with delinquency problems for eligibility. From the 98 youths who met the inclusion criteria and volunteered, 84 were randomly selected. The participants were given numbers from 1 to 84 based on their scores on the Patient Health Questionnaire (PHQ-9) and assigned to either the intervention (n=42) or the control group (n=42), using a randomized block design (block size=4), with 2:2 central allocation concealment performed by the research assistant (RA) who was not involved in the trial.

None of the participants dropped out during this study but one of those from the experimental group was on parole and one was out of detention at one month follow up. Then, they received a follow-up phone call. In the two-month follow-up period, of the three participants from the experimental group, two were on parole and the other out of detention, got a follow-up phone call, the same as two participants from the control group who were also out of detention. (see Figure 1)

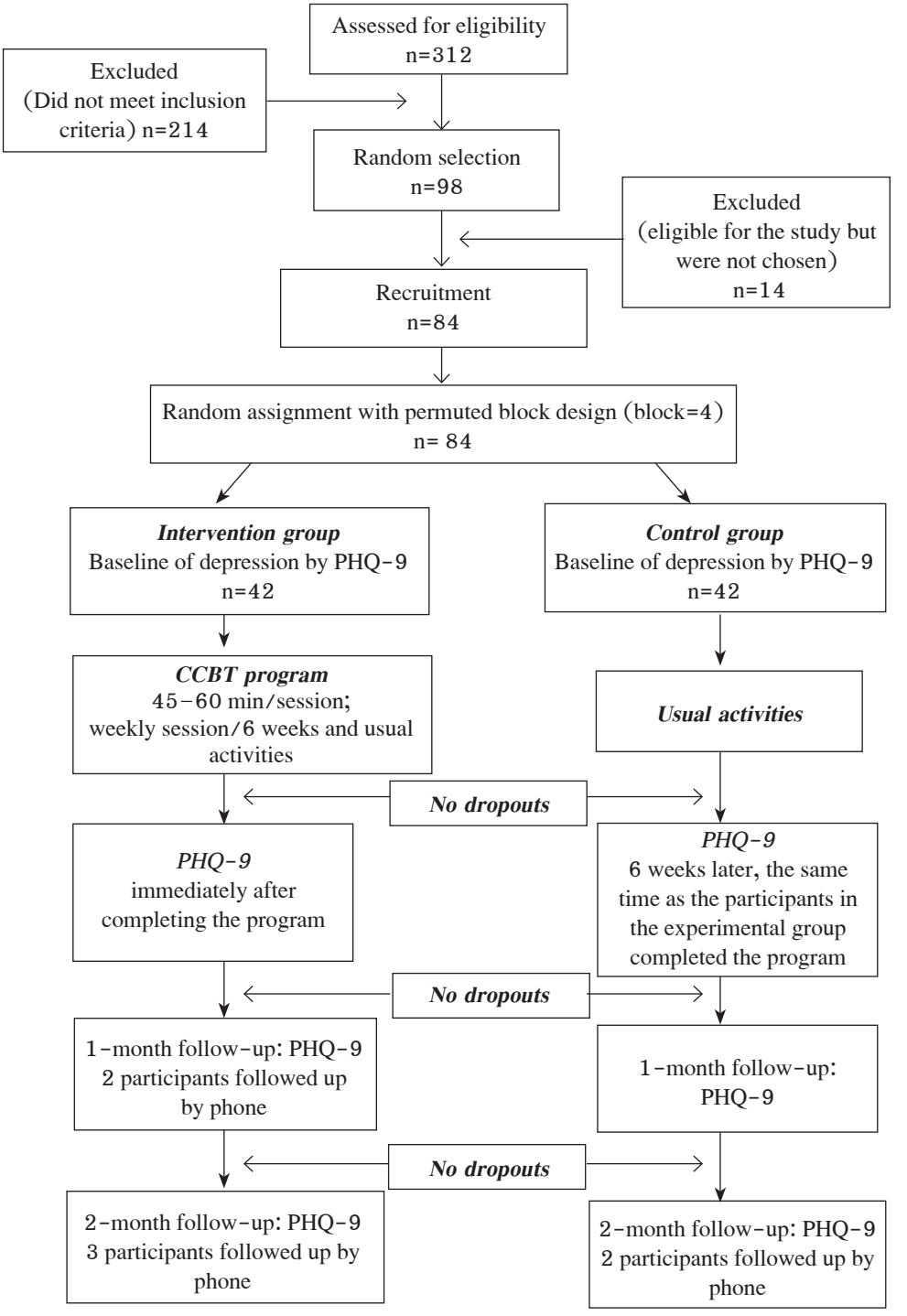


**Figure1.** The participants included in the study based on the CONSORT flow diagram

***Instruments:*** Three instruments were used.

A *demographic data questionnaire* was developed by the PI and consisted of personal data, including gender, age, education, type of offense, date of confinement, duration of confinement, length of confinement, and present illness if any.

*The Thai version Patient Health Questionnaire (PHQ-9)* translated from the original PHQ-9 by Lotrakul and colleagues[20] was used to measure depression in youth in the juvenile vocational training center. The PHQ-9 is a 9-item self-report rating scale (0-3) based on the 9 DSM-IV criteria for major depressive episodes[21] such as functionally impaired, and cognitively intact. Item 9, especially, which inquires about both passive thoughts of death and active ideas of self-harm, has been used to assess suicide risk. The item asking individuals "How often have you been bothered by thoughts that you would be better off dead or of hurting yourself in some way?" with had response options ranging from "not at all" to "nearly every day." The total scores range from 0 to 27. Only those with a score within the range of 9-19 representing mild to moderate depression were considered eligible to participate in the study. The PHQ-9 internal consistency was tested before using in the study, and the Cronbach's alpha was 0.83 while the reliability in the actual study was 0.76.

*The Guided Self-Help CPT Program with Therapist Support* developed by the researchers was based on Beck's Cognitive Theory (2011)[7] and the ADDIE Model of Instructional Design by Seels and Glasglow (1998)[22], and was used as an intervention for the experimental group. The content validity of the program was examined by 6 experts. The program was revised according to the experts' recommendations for improving content validity and language appropriateness before the study and tested with 5 youths with delinquency problems to find any errors and to be further improved based upon participants' recommendations. Subsequently, each session of the program was tested for clarity, comprehensibility, and feasibility of the instructions via a pilot test with 10 depressive youths with delinquency problems.

The experimental program consisted of six sessions in a series of 45-60 minute-long weekly sessions. The program content included a conceptualization of depression; a method of self-observation, and self-rating of NATs and negative emotions; modification of thinking; and problem-solving. The process of the intervention program followed the CBT processes: identifying, evaluating, and modifying NATs.

The first session starts with depression information and the cognitive model of depression for encouraging participants to learn the link between thoughts, feelings, behavior, and depression. The second session focuses on mood monitoring and emotional literacy. Participants can explore the relationship between the different aspects of thought and emotion and physical reaction, and learn how to identify and change unhelpful thinking through case studies and interactive exercises. The next three sessions of the CCBT program support participants to identify, evaluate, and modify NATs and problem solving by using case studies, interactive exercises, and their own situation. The last session outlines the guiding principles of the CCBT program for reducing depression and encouraging positive reinforcement and self-motivation. The outcome is expected to enhance efficient thinking patterns and cognitive processes, thus leading to reduction of depression.

After the introduction, which shows an overview and demonstrates how to use the program, the participants in the treatment group continued using the program independently on the computer that had only the CCBT program. Participants could repeat sections as desired. However, the use of the program by participants was under the control of the RA (Research assistant) who was not involved in the trial. At the time of intervention, they received brief therapist support by getting useful feedback and reinforcement on their homework assignment sheets. No face-to-face therapy was provided.

***Usual activities***: Usual activities refer to the

routine activities provided for adolescents with depression in the juvenile vocational training center, these activities do not focus on cognitive restructuring and changing adolescents' thought, including mental status examination and supportive counseling by the psychologist.

***Data collection***: The demographics of the participants in both groups were recorded before beginning the intervention. The experimental group received the CCBT program with brief therapist support once a week, 45-60 minutes per session within 6 weeks and usual activities, while the control group received the only usual activities. The six sessions of the CCBT program covered the core concepts and procedures of Beck's Cognitive Therapy for modifying negative cognition leading to depression reduction. The intervention process of the program followed the process of CBT included identifying, evaluating, modifying negative automatic thoughts cause of depression and problem solving. Immediately after completing the program, the RA collected the data on depression with PHQ-9 of both groups and, again, after the first and the second months after the completion of the program (Figure 1). Two participants in the experimental group were interviewed over the phone after the first month because they had been released from the center. There were three youths in the experimental group and two youths in the control group who were interviewed via phone after the second month.

***Data analysis***: The descriptive of demographic characteristics were analysed as percentages and means. In order to determine the equivalence of the experimental group and control group, Chi-square test and t-test were used. Analysis of covariance was used to examine the effects of CCBT program within the two groups while t-test was used to analyse the effects of CCBT program between the two groups because of the finding of interaction effects of time and participants.

## Results

The majority of the participants in both the experimental and the control group were male; finished junior high school; in confinement for the first time; and involved in drug cases. The mean age in the experimental group was 17.74 years (SD=.96), the same as the mean age of those in the control group (SD=1.39). Most participants in both groups had the duration of confinement as 1 year to 3 years and the durations of mean confinement were 2.55 years (SD=1.19) and 2.57 years (SD=1.60). No participants displayed any serious physical or mental illness during the study. Although, many participants of both groups experienced minor illness, no significant differences in the demographic characteristics were found between the two groups ($\alpha$=.05) **(Table 1-2)**.

A comparison of the mean depression scores

**Table 1** Comparison of the Demographic Characteristics of the Participants by t-test

| Demographic characteristics | Experimental group (n=42) | | Control group (n=42) | | t-test | *p-value* |
|---|---|---|---|---|---|---|
| | n | % | n | % | | |
| Age (years) | | | | | | |
| 14-16 | 4 | 9.5 | 5 | 11.9 | | |
| 17-19 | 36 | 85.7 | 36 | 85.7 | | |
| 20-22 | 2 | 4.8 | 1 | 2.4 | | |
| Mean(SD) | 17.74(1.398) | | 17.74(.964) | | .582 | .562 |
| Duration of confinement | | | | | | |
| 6 months to 1 year | 5 | 11.9 | 13 | 31 | | |
| >1-3 years | 31 | 73.8 | 19 | 45.2 | | |
| >3-5 years | 1 | 2.4 | 4 | 9.5 | | |
| >5 years | 5 | 11.9 | 6 | 14.3 | | |
| Mean(SD) | 2.55(1.19) | | 2.57(1.60) | | .365 | .716 |

*Note:* t-test, p<.05

**Table 2** Comparison of the Demographic Characteristics of the Participants by Chi-square test

| Demographic characteristics | Experimental group (n=42) | | Control group (n=42) | | Chi-square | *p-value* |
|---|---|---|---|---|---|---|
| | n | % | n | % | | |
| Gender | | | | | .000 | 1.000 |
| Male | 39 | 92.9 | 39 | 92.9 | | |
| Female | 3 | 7.1 | 3 | 7.1 | | |
| Education | | | | | .105 | .746 |
| primary school | 5 | 11.9 | 6 | 14.3 | | |
| high school | 37 | 88.1 | 36 | 85.7 | | |
| Type of offense | | | | | 1.407 | .704 |
| assault | 5 | 11.9 | 3 | 7.1 | | |
| sexual offense | 4 | 9.5 | 2 | 4.8 | | |
| theft | 12 | 28.6 | 13 | 31 | | |
| drug use | 21 | 50.0 | 24 | 57.1 | | |
| Number of confinements | | | | | .819 | .365 |
| first time | 36 | 85.7 | 37 | 88.1 | | |
| more than one time | 6 | 14.3 | 5 | 11.9 | | |
| Present illness | | | | | .105 | .746 |
| yes (muscle- pain, catch a cold, urticaria) | 36 | 85.7 | 37 | 88.1 | | |
| no | 6 | 14.3 | 5 | 11.9 | | |

*Note:* Chi-square test, *p<.05

between the experimental and the control groups at each point revealed significant differences in the mean depression scores immediately after completing the CCBT program (p<.05), while the mean depression scores at the baseline and on following up at 1 month and 2 months after finishing the intervention were not significantly different (**Table 3**).

Regarding the mean depression score of the

**Table 3** Comparison of Mean Scores of Depression between Experimental and Control Groups at Baseline, Immediately after Completing Program, and on Follow-up at 1 Month and 2 Months after Intervention

| **Depression** | **Experimental group (n=42)** | **Control group (n=42)** | **t** | ***p-value*** |
|---|---|---|---|---|
| | **Mean(SD)** | **Mean(SD)** | | |
| Baseline | 11.88 (2.86) | 11.52 (2.73) | .589 | .559 |
| Immediately after completing the program | 6.10 (4.35) | 12.0 (2.97) | −7.265 | .000* |
| Follow-up after 1 month | 6.02 (4.70) | 7.45 (3.67) | −1.552 | .0625 |
| Follow-up after 2 months | 5.64 (4.99) | 6.98 (4.11) | −1.337 | .092 |

*Note*: Independent t-test,*p< .05

experimental group, the results demonstrated significantly ($p<.05$) lower mean scores of depression immediately after completing the program and on following up at 1 month and 2 months compared to the baseline mean scores. As for the control group, the mean depression score immediately after the program was not lower than the mean depression score at the baseline. However, the mean depression scores on following up at 1 month and 2 months were significantly ($p<.05$) lower than the mean depression score immediately after the program ($p<.05$) **(Tables 4-5)**.

**Table 4** Comparison of Depression within Experimental and Control Groups at Baseline Immediately after Completing the Program, and at 1-month and 2-month Follow-up after Intervention

| Depression | Mean(SD) | | | | F | *p-value* |
|---|---|---|---|---|---|---|
| | Baseline | Immediately after completing the program | 1-month follow-up | 2-month follow-up | | |
| Experimental groups (n=42) | 11.88 (2.86) | 6.10 (4.35) | 6.02 (4.70) | 5.64 (4.99) | 48.68 | .000* |
| Control groups (n=42) | 11.52 (2.73) | 12.0 (2.97) | 7.45 (3.67) | 6.98 (4.11) | 31.87 | .000* |

*Note*: One-Way Repeated Measure ANOVA, *p<.05.

**Table 5** Comparison of Mean Depression Scores at Different Points of Measurement within Experimental and Control Groups

| Depression | Mean(SD) | | | | 1 vs 2 | 1 vs 3 | 1 vs 4 | 2 vs 3 | 2 vs 4 | 3 vs 4 |
|---|---|---|---|---|---|---|---|---|---|---|
| | Baseline (1) | Immediately after completing the program (2) | 1-month follow-up (3) | 2-month follow-up (4) | | | | | | |
| Experimental group (n=42) | 11.88 (2.86) | 6.10 (4.35) | 6.02 (4.70) | 5.64 (4.99) | .00* | .00* | .00* | 1,00 | 1,00 | 1,00 |
| Control group (n=42) | 11.52 (2.73) | 12.0 (2.97) | 7.45 (3.67) | 6.98 (4.11) | .98 | .00* | .00* | .00* | .00* | 1,00 |

*Note:* Post Hoc for One-Way Repeated Measure ANOVA, * p<.05.

## Discussion

Results of the study revealed that the participants who received the CCBT program had lower mean scores of depression immediately after completing the program when compared to the baseline score. The findings demonstrated the positive effects of a CCBT program in reducing depression among youths with delinquency problems immediately after completing the program. Furthermore, those who received the CCBT program had lower mean scores of depression than those that received only the usual activities immediately after completing the program.

The Cognitive Theory of Depression hypothesized that negative cognition leads to the symptoms of depression.[23] Therefore, the process of CBT can guide individuals with depression to generate more realistic alternative thoughts and increase positive

statements about themselves.[7] When there is a change in depressed and negative cognition, individuals experience improvement in their emotional state and behavior, which reduces depression.[7]

Similarly, depressed youths with delinquency problems could improve self-observation of NATs, negative emotions, as well as consequent problems though the process of CBT in the program. The exercise of the CCBT software program and homework assignment sheets showed the increasing of their ability to identify and test the validity of the NATs, and replace with a more appropriate one which was expected to reduce the symptoms of depression. The other success of the treatment program was seen in the change in attitudes of youths with delinquency problems in that after completing the treatment, they no longer endorsed negative thoughts of themselves and the state of being incarcerated. In addition, they also made plans for their future, which is indicative of approved cognitive restructuring.

This finding is consistent with the findings of a number of studies on the effectiveness of the CCBT program in improving depression.[24-25] Strong evidence also suggests that CCBT is currently one of the most effective treatment options recommended in cases of adolescent depression[26] and brief therapist support can increase the effectiveness of CCBT performance.[27] Additionally, the good cooperation and high attention of the youths with delinquency problems to the CCBT program are also valuable factors for enhancing the effectiveness of the CCBT program in this study. Similarly, a recent systematic review of a computer-based CBT program for depression found that CCBT was an effective and acceptable treatment for adolescents with symptoms of depression. This can be explained by the fact that technology-based delivery options may be even more acceptable and beneficial to young people.[28]

Furthermore, although the experimental group revealed no statistical difference in the mean depression scores between immediately after completing the program and 1-month and 2-month follow-up times, they had shown no depression, no relapse, and no recurrence of depression through the 1-month and the 2-month follow-up periods after the intervention. This finding is consistent with a previous study on the long-term effects of CBT. The study indicated that CBT appeared to have an enduring effect beyond the completion of the treatment.[29] CBT could reduce the relapse rate over 24 months.[29] In contrast, an early study indicated that the effects of CBT treatment for depression and anxiety tend to diminish over time.[30] A recent meta-analysis using 14 RCT studies and 2,807 depressed participants aged 18 and over indicated that CCBT improved depressive symptoms only in the short term. To maintain and improve CBT skills over time, research suggested that booster sessions on the CBT treatment in order to induce cognitive training and behavior change could be productive.[30]

Positive activities were the other factor that can be explained in terms of external or historical events that occurred during the course of the study which may have been responsible for the maintaining of depression reduction in the experimental group. Positive activities were simple, intentional, and regular practices meant to do an impression of the healthy thoughts and behaviors associated with naturally happy people.[31] Sporting events, music contests, and a special family visiting day were positive activities or external events occurring before the follow-up time of the study. All positive activities were the extra events occurring apart of usual activities that was a policy of the Department of Juvenile and Vocational Training Center of Thailand. However, all positive activities were significant factors that improve depression. For example, although a family can visit their adolescent children every month for 1-2 hours, they can use all day together with the family on a special visiting day. Moreover, some of the youths could go home to visit their family, another positive experience for them. Therefore, positive activities might be a significant factor involved in the maintaining a lack of depression of the experimental group over the follow-up period.

Consequently, these positive activities were also the external events affecting depression in the control group.

Positive activities might also be a significant factor involved in the reduction of depression among the youth in the control group which may have been responsible for the effects instead of the treatment. Positive activities can help depressed persons to improve their moods and symptoms by themselves without an external agent such as a therapist or an antidepressant. Then, the evidence indicates that positive activities could be used as a treatment for depression.[32] This is consistent with the outcome in the participants of the study: they reported their happiness after participating in the activities.

In conclusion, the findings of this study suggest the effectiveness of a CCBT Program for the treatment of depression among youths with delinquency problems.

## Limitations

The intervention was conducted at only one juvenile vocational training center in northern Thailand, which may not be representative of depressive adolescents in other communities. Another limitation may be that the study followed the participants only two months. There are no longer measurements of the effectiveness of the treatment expectations. Therefore, it is unclear whether our results can be sustained. Moreover, some conditions were out of the researcher›s control in this study; for instance, the environment, unexpected situations or activities, as well as the participants' attitudes toward both groups that could not be controlled.

## Implications for Nursing Practice

The CCBT program developed for this study was demonstrated to be effective in reducing depression among youths with delinquency problems immediately after completing the intervention. This finding can contribute to nursing practice or mental healthcare for this group youths. However, further studies of the long-term impacts (6 months and 12 months) of the CCBT program is needed to examine the sustainability of depression reduction among youths with delinquency problems after the intervention. Additionally, booster interventions should be provided. Future studies may also be needed to conduct on depressive adolescents in other communities.

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# ประสิทธิผลของโปรแกรมคอมพิวเตอร์บำบัดทางความคิดและพฤติกรรมในเยาวชนที่กระทำผิดกฎหมายที่มีภาวะซึมเศร้า: การทดลองแบบสุ่มและมีกลุ่มควบคุม

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**บทคัดย่อ:** ภาวะซึมเศร้าของเยาวชนไทยที่กระทำความผิดส่งผลกระทบต่อการดำเนินชีวิตประจำวันและความสัมพันธ์ทางสังคมที่จำเป็นต้องได้รับการบำบัดรักษา การใช้คอมพิวเตอร์ช่วยในการบำบัดทางจิตได้รับการพิสูจน์แล้วว่าเป็นการเปลี่ยนรูปแบบการให้การดูแลสุขภาพจิตที่สามารถลดภาวะซึมเศร้าและเพิ่มการเข้าถึงการบำบัดได้มากขึ้น การวิจัยทดลองแบบสุ่มและมีกลุ่มควบคุมนี้มีวัตถุประสงค์เพื่อศึกษาประสิทธิผลของโปรแกรมคอมพิวเตอร์บำบัดทางความคิดและพฤติกรรมต่อการลดภาวะซึมเศร้าของเยาวชนในศูนย์ฝึกและอบรมเด็กและเยาวชน

กลุ่มตัวอย่างเป็นเยาวชนที่เข้ารับการบำบัดในศูนย์ฝึกและอบรมเด็กและเยาวชนเขต 7 จังหวัดเชียงใหม่ จำนวน 84 คน ที่มีอายุ 14 -18 ปี ณ วันที่กระทำความผิดและมีคุณสมบัติตามเกณฑ์ที่กำหนดและได้รับการสุ่มแบบบล็อก เข้ากลุ่มทดลองหรือกลุ่มควบคุมในสัดส่วนที่เท่ากัน โดยกลุ่มทดลองจะได้รับโปรแกรมคอมพิวเตอร์บำบัดทางความคิดและพฤติกรรมที่ผู้วิจัยสร้างขึ้นรวมทั้งกิจกรรมตามปกติของศูนย์ฝึกและอบรมเด็กและเยาวชน ขณะที่กลุ่มควบคุมได้รับเฉพาะกิจกรรมตามปกติของศูนย์ฝึกฯ รวบรวมข้อมูลโดยใช้แบบสอบถามสุขภาพฉบับภาษาไทย ในระยะก่อนและหลังการได้รับโปรแกรม และ 1 และ 2 เดือนหลังสิ้นสุดโปรแกรม วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนา การวิเคราะห์ความแปรปรวนแบบวัดซ้ำทางเดียวและการทดสอบความแตกต่างค่าเฉลี่ยสองกลุ่มที่อิสระต่อกัน

ผลการวิจัยพบว่ากลุ่มตัวอย่างที่ได้รับโปรแกรมคอมพิวเตอร์บำบัดทางความคิดและพฤติกรรมมีคะแนนเฉลี่ยภาวะซึมเศร้าภายหลังสิ้นสุดโปรแกรม และ 1 และ 2 เดือนภายหลังการได้รับโปรแกรมต่ำกว่าในระยะก่อนได้รับโปรแกรมอย่างมีนัยสำคัญทางสถิติ และเมื่อเปรียบเทียบคะแนนเฉลี่ยของภาวะซึมเศร้าทั้งสองกลุ่มพบว่าเยาวชนในศูนย์ฝึกอบรมเด็กและเยาวชนกลุ่มที่ได้รับโปรแกรมคอมพิวเตอร์บำบัดทางความคิดและพฤติกรรมมีคะแนนเฉลี่ยภาวะซึมเศร้าต่ำกว่าเยาวชนกลุ่มที่ได้รับกิจกรรมตามปกติของศูนย์ฝึกและอบรมเด็กและเยาวชนอย่างมีนัยสำคัญทางสถิติในระยะสิ้นสุดโปรแกรม

ผลการศึกษาชี้ให้เห็นว่าโปรแกรมคอมพิวเตอร์บำบัดทางความคิดและพฤติกรรมควรได้รับการพิจารณาในการนำไปใช้ในเพื่อลดภาวะซึมเศร้าในเยาวชนในศูนย์ฝึกอบรมเด็กและเยาวชนต่อไป

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