The effects of cognitive behavioural therapy on depression, anxiety, stress, and self-esteem in public health students, Thailand

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Abstract:

BACKGROUND: This study aimed to investigate the effect of group cognitive behavioral therapy (CBT) on depression, anxiety, stress, and self-esteem in public health students at the University in Southern Thailand.

MATERIALS AND METHODS: The study employed a quasi-experimental, one-group, and pre-test -post-test design. Purposive sampling was employed to include 31 students, selected from those with screening indicating mild to moderate depression. While 28 of them (90.3%) were female, three (9.7%) were male. Their age range was 18-21 years, averaging 19.5 years. The instruments were the Thai translation of the Depression, Anxiety, and Stress Scale (DASS-21) and the Thai version of the Rosenberg Self-Esteem Scale (RSES), which were evaluated and produced high validity and reliability results. Data was collected through online questionnaires. A pre-test and a post-test were utilized to measure the participants' depression, anxiety, stress, and self-esteem before and after participating in a group CBT, comprising eight sessions in two months.

RESULTS: Revealed significant improvements in depression ($P = .001$), anxiety ($P = .040$), and stress ($P = .002$), while self-esteem ($P = .465$, $>.05$) was not significant.

CONCLUSION: Group CBT sessions were effective at relieving depression, anxiety, and stress, but not self-esteem. Accordingly, further studies might consider these results and expand on this topic by broadening the population to different majors.

Keywords:

Anxiety, cognitive behavioral therapy, depression, public health students, self-esteem, stress

Introduction

Mental health disorders are one of the world's most serious public health problems, especially among university students transitioning from high school to university.[1] University students may find the transition process difficult because they must adjust to several changes, including learning styles, friends, self-management, relationships, and community.[1-4] Students who are unable to cope with obstacles are likely to be stressed. Unresolved stress might have a negative influence on their academic achievement. If university students consistently regard problems as negative and unmanageable, further psychological problems such as anxiety, helplessness, and/or depression may develop.[5]

Depression, anxiety, and stress were the most prevalent psychological problem among health science university students, and they occur in both developed and developing countries.[6-8] According to a study conducted in the United States, 88 percent of medical students had moderate to severe stress, 44 percent had moderate

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to severe anxiety, and 36 percent had moderate to severe depression.[9] According to Chinese research, 18.47 percent, 12.26 percent, and 8.53 percent of people had anxiety, moderate to severe depression, and stress symptoms, respectively.[10] Psychological problems such as depression, anxiety, and stress are frequent among nursing and medical students in Thailand, according to statistics from the National Statistical Office.[7] In addition, according to a report about adolescent mental health problems, 15.0 percent of Thai adolescents expressed the desire to die, and 13.0 percent had attempted to commit suicide.[11] Furthermore, such problems are the second most significant cause of mortality among 15-29-year-olds.[12]

Treat students' psychological problems, Cognitive-Behavioural Therapy (CBT) was employed as a psychological intervention.[5] CBT is a type of talking therapy based on Beck's theory[13] with the idea that our thoughts (cognition), feelings (emotion), and (actions) are all intertwined. In other words, our feelings and behaviors are determined by our thoughts.[14,15] This indicates that if university students who have faced the problem of adapting repeatedly regard obstacles as negative and uncontrollable, they will feel helplessness, stress, anxiety, and depression.[5] As a result, CBT is an effective therapy for resolving psychological problems among university students. According to a review of previous studies, CBT has been shown to reduce depressive symptoms,[8,16-18] prevent and cure depression in high-risk first and second-year undergraduate students, boost self-esteem,[8] reduce dysfunctional attitudes, decrease anxiety[16,17,19] increase positive future expectation,[19] reduce stress, increase achievement, and improve coping strategy.[17] Different approaches to additional therapeutic interventions, such as attentional bias correction and an active attentional control condition, were also investigated. The result revealed that CBT remains the most effective psychotherapy treatment.[20]

Students currently studying in the health sciences must concentrate their academic studies on both theoretical and practical training. Therefore, students, especially in the field of public health, may experience stress and anxiety, negatively impacting their mental health and contributing to poor academic performance. In addition to participating in theoretical and practical training like other health science students, public health students are required to take part in community internships for longer. Consequently, they are in a position to deal with a diverse range of individuals and cultures. Therefore, their theoretical knowledge must be put into practice to interact with a wide range of individuals, societies, cultures, and local situations to succeed according to the subject's objectives. This type of environment has the potential to induce psychological problems, especially depression, anxiety, stress, and low self-esteem, which are already the most frequently diagnosed among public health students. Therefore, the objective of this study is that CBT is used as a therapy to determine the effectiveness of depression, anxiety, stress, and self-esteem in public health students. Overall, this study indicates the feasibility and acceptance of a participatory group CBT for public health students. Our results can be used as a group CBT intervention to promote mental health and reduce depression, anxiety, and stress in students.

Materials and Methods

Study design and setting
The study employed a quasi-experimental, one-group, and pre-test -post-test design.

Study participants and sampling
The population was 575 students at the school of public health of a University in Southern Thailand in their year one-three, semester three, the academic year 2020. Four-year students were not excluded since they were occupied with their internships and unavailable for group CBT.

The participants included 31 students at the school of public health in their year one-three, semester three, the academic year 2020. These students were both male and female aged 18-21 years screened with mild (DASS-21 depression scores within five-six) to moderate (DASS-21 depression scores within seven-ten) depression. Purposive sampling was employed to select the students through the following procedures:

Step one: Microsoft Teams was employed to communicate information related to this research, including the objectives, data collection procedures, and potential benefits with students in Year one-three of the School of Public Health. The students were free to ask questions before deciding whether to participate in the project. Subsequently, the 575 students at the School of Public Health in their Year one-three, Semester three, Academic Year 2020, were asked to complete questionnaires on general information, the Thai version of the Depression Anxiety and Stress Scale (DASS-21), and the Thai version of the Rosenberg Self-esteem Scale (RSES) via Google Forms. Eventually, 278 returned questionnaires were obtained.

Step two: The participants were purposively selected based on the inclusion criteria: 1) the students must be from the School of Public Health and enrolled in Year one-three, Semester three, and Academic Year 2020; and 2) the students must have demonstrated

mild to moderate depression. Based on the criteria, this study initially obtained 42 students. However, 11 of them were not included in this study because they could not attend all eight sessions and had to attend required university activities. Still, their cases were followed-up and referred further to advisors supervised by Smile and Smart Centre. Hence, 31 final participants attended the eight sessions of group CBT. In addition, the exclusion criteria were 1) normal students without indication of depression (N = 227 and DASS-21 depression scores within zero-four), 2) students with severe depression (N = 6 and DASS-21 depression scores within 11-13), and 3) those with extremely severe depression (N = 3, DASS-21 depression scores within 14+, and the cases referred to psychiatrists at university hospital) [See Figure 1].

Data collection tool and technique

The questionnaire consisted mainly of three parts: demographic, the Thai version of the Depression Anxiety and Stress Scale (DASS-21), and the Thai version of the RSES.

1. Questionnaires on personal data, i.e., gender, age, marital status of parents, student's sponsor, GPA, family's monthly income, and student's monthly income.

2. The Depression Anxiety and Stress Scale (DASS-21)[21,22] is a standard screening tool used worldwide to assess symptoms of depression, anxiety, and stress in community settings. The translation of DASS-21 from English to Thai was carried out during the cross-cultural translation procedures. This Thai ve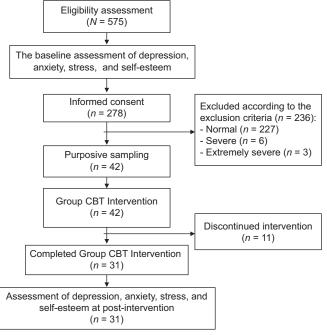rsion of DASS-21 was designed to quantitatively measure distress along the three axes of depression, anxiety, and stress.[22] The Thai version of DASS-21 is a self-report measure of negative effects in three parts (i.e., depression, anxiety, and stress), seven-item subscales. The depression subscale included items 3, 5, 10, 13, 16, 17, and 21. The anxiety subscale comprised items 2, 4, 7, 9, 15, 19, and 20. The stress subscale came with items 1, 6, 8, 11, 12, 14, and 18. The psychometric properties of the short version of DASS are well established.[21] Responses are structured using a four-point Likert scale ranging from zero ("does not apply to me at all") to three ("applies to me very much or most of the time"), with higher scores indicating more negative experiences in the past week. Scores for each subscale are obtained by summing the responses to the component items.[23] Scores for each subscale ranged from 0–21. DASS-21 has high validity and reliability and is widely utilized among university students[21,24-26] Cronbach's alpha coefficients of depression, anxiety, and stress for The thai version are 0.82, 0.78, and 0.69, respectively.[22] In this study, the reliability values were. 83.,71, and. 74, respectively [see Table 1].

3. Rosenberg Self-Esteem Scale was translated into Thai, and its content validity was checked by back-translation. The reliability scale was compared against the Self-Esteem Visual Analog Scale.[27] This scale is probably the most employed global self-esteem measure in Social Sciences. The scale typically comes with ten response items and a four-point Likert rating. respondents completing this scale are asked to provide ratings according to their levels of agreement (i.e., 1 indicating the lowest agreement and 4 indicating the strongest agreement), whereas five of the response items are positively worded, and the other five are negatively worded. The sum of a total score sits somewhere between 0 and 30. Higher scores are interpreted as respondents demonstrating higher self-esteem and vice versa. This instrument usually has high reliability because its test-retest correlations tend to be within 0.82-0.88 and Cronbach's alpha was 0.84,[28] and The Cronbach's Alpha for the RSES Thai version was 0.849,[27] and 0.78 in this study.

Figure 1: Flow chart of the study procedure

Table 1: DASS Scoring: The categorization of severity of the three negative emotions by the range of sum-score from seven items in each category

Severity	Depression scores	Anxiety scores	Stress scores
Normal	0-4	0-3	0-7
Mild	5-6	4-5	8-9
Moderate	7-10	6-7	10-12
Severe	11-13	8-9	13-16
Extremely severe	14+	10+	17+

Procedure

Microsoft Teams was employed to communicate information related to this research, including the objectives, data collection procedures, and potential benefits with students in Year one-three of the school of public health. The students were free to ask questions before deciding whether to participate in the project. Subsequently, the 575 students at the school of public health in their year one-three, semester three, the academic year 2020, were asked to complete questionnaires on general information, DASS-21 Thai-version,[21,22] and RSES Thai version[27,29] via Google forms. Eventually, 278 returned questionnaires were obtained. Subsequently, 42 participants were purposively selected based on the inclusion and exclusion criteria to attend group CBT administered in eight weekly intervention sessions and taking approximately 60-90 min each by the researchers at the counseling center. Note that 11 students could not complete all eight sessions because they had to attend required university activities. Hence, their cases were followed-up and referred to advisors supervised by Smile and Smart Centre. Hence, 31 final participants attended the eight sessions of group CBT. To ensure compliance with rules that the participants jointly proposed, measures were issued and implemented throughout the study, including (1) reminder messages and phone calls throughout the therapy, (2) a Line group created by the researchers for group communication and group activity notifications, and (3) positive reinforcements in each session of group CBT, such as words of encouragement, reflections and lessons learned. After eight weeks, all the participants took the post-test of the DASS-21 Thai version and the RSES Thai version. Eventually, the data were processed with quantitative analysis.

Group CBT

The program revolved around the understanding of cognitive behaviors, the interrelatedness between cognitive corrections and therapeutic efforts, and positive reinforcement. The contents of the group CBT program were based on Yalom, Beck, and Ellis.[30-32] This program of therapies uses a group process to promote participants' cognitive, Behavioural, and relational changes, strengthen their coping skills, and generally help them resolve difficulties they might be experiencing.[33] Simply put, the group program is added to the usual cognitive and Behavioural mechanisms from CBT, and this dynamic approach help participants recover from their existing distorted, maladaptive, and dysfunctional perceptions and behaviors.[34] The content validity and applicability of the group program were received from a doctor of psychiatry, a psychiatric nursing professor, and a counseling professor at the counseling center. Subsequently, the researchers used the obtained feedback from the three experts to revise group CBT to enhance consistency and objective congruence. Table 2 presents summaries of the CBT sessions.

Statistical analysis

The pre-test and post-test scores on depression, anxiety, stress, and self-esteem collected from the intervention sessions were analyzed in mean and standard deviation, and a pre-test the post-test comparison was subsequently conducted using the Wilcoxon signed-rank test.

Ethical consideration

The study was conducted after obtaining necessary ethical approvals from the ethics committee of the university (Grant No. WUEC-20-081-01), and all participants consented to the study in writing.

Results

Demographic data showed that the 31 participants included 28 female and 3 male tertiary students aged between 18 and 21 years at an average age of 19.5 years. Most of the participants lived with their parents, and most of their parents were still together. Most of their GPAs ranged from 2.51-3.01, and they earned incomes between 3001 and 4000 [see Table 3].

Different variables were introduced to the group CBT to test the effects in reducing the participants' mental health problems and neutralizing the depression levels previously measured as mild to moderate. After the intervention, anxiety scores revealed different percentages of anxiety severity reduction, and most of the ones previously at extreme levels were reportedly lowered. Furthermore, while stress scores showed a similar result, the self-esteem scores were different [see Table 4].

The Wilcoxon signed-rank test revealed that the variable-derived effects from the sessions of the group CBT created differences in reducing the participants' mental health problems [see Table 5]. More specifically, the decrease in depression scores was identified between before (M = 6.84, SD = 1.68) and after the treatment (M = 3.48, SD = 2.89) with statistical significance (Z = -4.20, P < .001). This outcome suggested that the group CBT was effective at decreasing the students' depressive symptoms.

Similar results occurred regarding anxiety. The intervention also reduced anxiety when comparing the pre-treatment scores (M = 5.84, SD = 3.79) to the post-treatment ones (M = 4.48, SD = 4.19) with statistical significance (z = -2.05, P = .040). The same goes for the treatment of stress. The results showed that

Table 2: Summary of the group CBT sessions

Sessions	Topics	Objectives
1	Building relationships and assessing cognitive behaviours	To inform the members about treatment guidelines, regulations, and mutual agreements
2	Psychoeducation: Depression	To offer the members opportunities to practice analysing depression-related correlations following the ABCs of Treatment
3	Identifying automatic negative thoughts	To inform the members about ways to record automatic negative thoughts that occurred in response to events
4	Checking automatic negative thoughts	To offer the members opportunities to check automatic negative thoughts by using evidence in support or against negative thoughts
5	Transforming automatic negative thoughts	To offer the members opportunities to find ways to be more optimistic
6	Problem-solving and coping skills	To equip the members with essential skills to find solutions to problems
7	Practicing generating new thinking	To brainstorm about the benefits of new thinking and applications in life
8	Preventing relapses and closing the group program	To offer the members opportunities to review and share lessons learned

Table 3: Participants' demographic characteristics

Characteristic demographics	Participants' (*n*=31)	
	Number	Percentage
Gender		
Male	3	9.7
Female	28	90.3
Age (years)		
18	5	16.1
19	11	35.5
20	9	29.0
21	6	19.4
Marital status (Parents)		
Coexist	21	67.7
Divorced	6	19.4
Separate	2	6.5
Mother died	1	3.2
Parents died	1	3.2
Live with		
Parents	21	67.7
Father	3	9.7
Mother	5	16.1
Other	2	6.5
GPA		
2.01-2.50	2	6.5
2.51-3.00	15	48.4
3.01 and up	14	45.1
Monthly family income		
<15,000	5	16.1
15,001-25,000	17	54.8
25,001-30,000	5	16.1
30,001-45,000	2	6.5
Over 45,000	2	6.5
Student income		
<3,000	6	19.4
3,001-4,000	15	48.4
4,001-5,000	1	3.2
5,001-6,000	6	19.4
Over 6,000	3	9.6

the intervention decreased the students' stress when compared scores from before the therapy (M = 8.13, SD = 3.73) to the ones after the sessions (M = 4.94, SD = 3.68). This change was also with statistical significance ($z = -3.17, P = .002$). However, the intervention did not seem to work in restoring self-esteem [see Table 5].

Discussion

This study evaluated the effects of group CBT, as proposed by Yalom, Beck, and Ellis,[30-32] in Public Health students with mild to moderate depression. Significant improvements to primary symptoms were identified along with other social adaptability benefits.

This study offered another confirmation that CBT is effective in treating individuals with depression, stress, and anxiety as significant changes were evident in the experiment based on the employed psychiatric measurements.[35-38] By factoring in gender, it was found that most of the participants receiving the CBT therapy were female (90.3%), and this domination in the ratio is in line with the two: one female-to-male depression prevalence ratio.

According to the pre-test and post-test of the DASS-21 evaluation of depression, a significant reduction in depression severity was identified after the eight-week group CBT sessions. Based on DASS-21's response items, improvements were noticeable in all symptoms. A critical factor instrumental to the effectiveness of CBT in the battle against depression was group interaction because the participants felt less isolated and recognized that they did not have to fight through their struggles alone.[39] Furthermore, the CBT helped the participants enhance their coping mechanisms, emotional intelligence, and overall psychological well-being. This improvement was reflected by the lower prevalence of students feeling down, depressed, and hopeless. Evidence showed that the depression levels of these public health students significantly decreased because they learned to incorporate CBT techniques, i.e. transforming negative thoughts into optimism, internalizing behavioural planning skills, adopting social skills, and utilizing self-assertiveness, which were proven effective at reducing depression.[40-43]

Table 4: Comparison of numbers and percentages of the students by variables obtained before and after the treatment (n=31)

Variables	Pre		Post	
	n	Percentage	n	Percentage
Depression				
Normal			21	67.7
Mild	14	45.2	4	12.9
Moderate	17	54.8	6	19.4
Anxiety				
Normal	9	29.0	14	45.2
Mild	8	25.9	8	25.8
Moderate	5	16.1	4	12.9
Severe	4	12.9	2	6.4
Extreme	5	16.1	3	9.7
Stress				
Normal	13	41.9	26	83.9
Mild	6	19.4	2	6.5
Moderate	8	25.8	1	3.1
Severe	4	12.9	2	6.5
Self-esteem				
Low	2	6.5	1	3.2
Moderate	28	90.3	30	96.8
High	1	3.2		

Table 5: Effectiveness of the pre- and post-treatment based on the results of depression, anxiety, stress (DASS-21), and self-esteem (Rosenberg)

Variables	Pre		Post		Z	P
	M	SD	M	SD		
Depression	6.84	1.68	3.48	2.89	-4.20	.000**
Anxiety	5.84	3.79	4.48	4.19	-2.05	.040*
Stress	8.13	3.73	4.94	3.68	-3.17	.002**
Self-esteem	24.56	3.08	25.10	2.64	-.73	.465

*$P<0.05$, **$P<0.01$

In terms of participants' anxiety, the evaluation measured autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. CBT was also found to significantly help solve anxiety problems. Statistics over the eight weeks suggested that CBT played a vital role in reducing anxious symptomatology. Furthermore, CBT was found effective in decreasing anxiety levels of Public Health students with depression, especially when it was used as an early treatment option for anxiety disorders.[44,45] Through the help of CBT, the students learned to generate new thinking and make behavioural adjustments to gradually convert maladaptive and dysfunctional perceptions into a more optimistic version. The CBT was advantageous in this case because it helped the students relax and restructure their cognitive behaviors. Through cognitive restructuring, students could then cope with anxiety-generating perceptions by carefully reviewing the evidence against such conceptions.[46] As the students relaxed, they experienced lower muscle tension, lower heart rates, lower respiratory rates, more efficient blood circulation, and stimulating brain function. In turn, these healthy physical states helped relieve their anxiety.[47,48]

This study also proved that CBT could adequately decrease stress among the sampled Public Health students. The results are in line with previous studies, confirming that CBT was highly instrumental in stress relief.[49-51] The CBT was also effective as the students were introduced to essential coping strategies and subsequently learned to adopt coping mechanisms and adaptability to manage and mitigate stress. The CBT was able to lower the students' stress levels because, through the process, the students were reminded that they did not have to fight with their problems and stress alone, and CBT offered them the stress management training that they needed to control stress and anxiety.[52]

In this study, CBT did not significantly improve self-esteem scores compared to previous research,[53,54] and it could be due to the duration of the experiment itself and the fact that the content on improving self-esteem was not as prioritized as that for dealing with mental disorders. Congruently with Choi,[55] self-esteem recoveries were not significantly impactful due to the experiment being too short for effective interventions.

Evidently, the group CBT sessions helped the students shape their personalities and behaviors through social interactions among the group members experiencing psychological difficulties triggered by similar situations (e.g., school relationships and family problems). The students participated in activities with members and group leaders and learned about the perceived benefits of this cooperation through group interactions. Group sessions also supported the students with a sense of confidence as they explored individual weaknesses and strengths and identified root causes that triggered negative self-concepts. The CBT also proved to be a cost-effective strategy because it could involve more patients in one go, meaning that CBT sessions could be held more frequently to maximize long-term benefits from group interactions. Finally, based on the overall results, CBT was considered ideal for treating tertiary students needing psychiatric support in educational environments.

Limitations and recommendation

This study employed quantitative instruments to measure the outcomes. Although these instruments were validated and significantly practical in strengthening the therapy, the study lacked a qualitative investigation. It only involved public health students with depressive symptoms. Hence, further studies might consider expanding on this subject matter by broadening its population to cover general students across Thailand. It is undeniable that the sample size of this study was too small for the results to be generalized. To accurately

represent the entire population, further studies are suggested to increase the number of participants. Purposive sampling was employed to select a limited number of participants because the main inclusion criterion aimed to obtain public health Students with mild to moderate depression. As a result, the study was able to test 31 participants and include them in the experimental group for CBT sessions. However, no participants were allocated to the control group due to ethical reasons. The justification was based on the logic that if some of them were in the control group, they would have missed the CBT activities, and by the time the research was over, it could have been too late to suppress or treat their conditions. Considering time and objective constraints, this study was only able to experiment with the therapy within a short run. Further research is suggested to extend the duration for long-term result tracking. This study investigated psychological phenomena, i.e. psychotherapy, that involved multiple variables, and its focus was on the variables that traditionally influence mental health. Nevertheless, future studies are suggested to incorporate other variables when evaluating the phenomena to enrich the explanations of such changes.

Conclusion

This study evaluated the effects of group CBT in reducing depression, anxiety, and stress in public health students. It is the results should be used cautiously due to low generalizability. However, combining the current results with those of past studies, it could be confirmed that CBT was beneficial for tertiary students in relieving depression, anxiety, and stress. Furthermore, group CBT was found helpful because of its cost-effectiveness, time efficiency, accessibility for more patients, group interactions, and group therapy (i.e. through interpersonal learning, imitative behaviors, and reduced isolation). Hence, it would be a plus to encourage group interventions simultaneously with individual counseling sessions and other primary preventive measures (e.g., psychoeducational seminars) to preserve tertiary students' mental well-being.

Ethical approval
Institutional Review Board Approval: The study was approved by the Ethics Committee of Walailak University (Grant No. WUEC-20-081-01).

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflicts of interest
There are no conflicts of interest.

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