Effects of a Self-Esteem Enhancement Program on Happiness and Depression in Pregnant Adolescents: A Randomized Controlled Trial

Suppalack Chokrak, Sopen Chunuan, Sasitorn Phumdoung*

Abstract: Pregnant women commonly experience feelings of unhappiness and depression during pregnancy, and depression has a negative impact on pregnant adolescents. This randomized controlled trial aimed to examine the effects of a Self-Esteem Enhancement Program on feelings of happiness and depression in pregnant adolescents. The sample consisted of pregnant adolescents who attended the antenatal clinic of a community hospital in southern Thailand from January to May 2024. The sample was randomly assigned to an experimental group and a control group using minimized randomization controlling for potential confounders. The experimental group (n = 21) received the program, while the control group (n = 25) received only usual care. Data collection was conducted using a Personal Information Questionnaire, the Self-esteem Questionnaire the Center for Epidemiologic Studies Depression Scale (CESD-10), and the Happiness in Pregnancy Questionnaire (HPQ). Data were analyzed using descriptive statistics, paired t-test, independent t-test, Wilcoxon signed ranks test, and Mann-Whitney U test.

The results showed that pregnant adolescents in the experimental group exhibited significantly higher mean scores for happiness and lower depression scores after completing the self-esteem enhancement program compared to their scores before the program. Additionally, a comparison between the two groups following the intervention showed that the experimental group had significantly higher happiness and lower depression than those in the control group. These findings suggest that the program effectively increased happiness and decreased depression among pregnant adolescents. Therefore, nurses and midwives should consider this program as a valuable guide for the care of pregnant adolescents. However, wide testing of this program is needed before integration into regular practice.

Keywords: Antenatal period, Depression, Happiness, Pregnant adolescents, Self-esteem enhancement program

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Introduction

Teenage pregnancies continue to be a worldwide problem that has a negative impact on birth outcomes in several ways. Most teenage pregnancies are unplanned, leading to increased physical and psychosocial health issues. Adolescent mothers are at a higher risk of eclampsia and infections compared to adult women, and their babies are at greater risk for low birth weight, prematurity, and severe illness.[1] Early teenage pregnancy can cause a range of emotional problems, such as stress, anxiety, and depression.[2] Depression is a leading cause of mental health issues worldwide. In low- and middle-income countries, the prevalence of antenatal depression ranges from 15% to 57%, with the highest rates observed among pregnant adolescents.[3] Depression affects 11-18% of pregnant women worldwide,[4] with higher rates in the second trimester[5] and in Thailand, the prevalence of depression in pregnant adolescents 10-19 years was 20.6%.[6] About 40% of pregnant women who visit the 11th Health Center for prenatal care suffer from depression,[7] which can harm both the mother and her fetus.

Nursing interventions to increase happiness in pregnant adolescents are limited, as no specific related programs have been identified. However, nursing interventions for reducing depression in this group recommend the use of informational programs[8] and positive self-talk training[9] to help address depression in pregnant women and adolescents. The results showed that these interventions were incompatible with promoting self-esteem. However, a self-esteem enhancement program was found to be effective for postpartum depression in adolescent mothers.[10] Self-esteem promotion programs have been shown to reduce depression in the elderly.[11] Similarly, the development of a self-esteem promotion program has helped reduce depressive symptoms in patients with schizophrenia,[12] though this was studied in a different population. Currently, there is limited research on self-esteem promotion programs for depression in pregnant adolescents, either in Thailand or globally.

The literature also highlights limitations in the methods of providing information to pregnant women. Healthcare professionals often rely on one-way communication due to high workloads and limited resources, leaving many pregnant women with inadequate knowledge.[13] Mobile applications, such as LINE, offer a promising alternative by facilitating user-friendly, two-way communication.[14] These platforms enable pregnant women to engage actively in learning through text, images, and videos, fostering a sense of support and interaction.[15]

Therefore, this study aimed to develop and evaluate a self-esteem enhancement program designed to improve happiness and reduce depression among pregnant adolescents. The program utilized e-books and manuals to deliver information, complemented by the LINE platform for interactive, two-way communication. This flexible approach was expected to enhance self-esteem, promote happiness, and reduce depression in this vulnerable population.

Conceptual Framework and Review of Literature

In this study, we developed a Self-Esteem Enhancement Program (SEEP) for pregnant adolescents, grounded in Rosenberg's self-esteem theory[16] and related literature. Rosenberg defines self-esteem as an individual's perception of their worth, which can be positive or negative, influencing relationships, social interactions, and overall well-being. Self-esteem comprises global self-esteem, reflecting overall self-esteem, and specific self-esteem, which pertains to evaluations in particular domains. Positive self-perceptions, such as viewing oneself as capable or respectable, enhance global self-esteem, while negative self-assessments may diminish it.[16] Studies have demonstrated that self-esteem is positively associated with happiness[17-18] and negatively associated with depression.[12]

Pregnant teenagers are especially vulnerable to low self-esteem. Interventions, such as positive self-talk,[9] mental health education,[8] and continuous monitoring[19] have been shown to improve self-esteem, making them valuable tools for preventing depression in this population. Self-esteem is pivotal in predicting happiness,[17] enhancing emotional well-being,[16] and mitigating depression.[20]

Happiness during pregnancy is linked to life satisfaction, a predominance of positive emotions over negative ones, and effective coping with stress.[17] It has been shown to reduce the likelihood of depression[21] and improve both maternal and fetal health outcomes. Conversely, unhappiness can lead to elevated cortisol levels,[22] which reduce progesterone production and stimulate prostaglandins, causing uterine contractions.[23] This process shortens pregnancy duration and increases the risk of preterm birth.[24] Unhappiness also lowers quality of life during pregnancy and increases unhealthy behaviors, such as smoking.[25] On the other hand, happiness triggers the release of endorphins, which extend pregnancy duration[26] and reduce the risk of preterm birth.[24] Pregnant women who are happy are also less likely to develop antenatal depression.[17]

Antenatal depression is a critical issue for pregnant adolescents. Studies indicate that the emotional and physical challenges of pregnancy often lead to depression in adolescents. Women experiencing depression during the first trimester are at a higher risk of suicidal thoughts[27] and postpartum depression.[28] Several factors contribute to antenatal depression, including socioeconomic disadvantage, lack of social support, and relationship problems. Pregnant adolescents frequently encounter socioeconomic challenges, such as poverty and limited educational opportunities, which heighten their susceptibility to depression.[29] Social isolation and inadequate support systems further exacerbate the risk.[30] Additionally, unstable or problematic relationships significantly increase the likelihood of depression during pregnancy.[31]

Happiness during pregnancy not only supports maternal mental health but also helps prevent postpartum depression.[21] By addressing the causes of mental health challenges and implementing effective interventions, midwives can help pregnant adolescents achieve positive well-being and ensure healthier pregnancies. This study integrated Rosenberg's self-esteem theory[16] with interventions, such as positive self-talk,[9] information provision,[8,32] ongoing support, and follow-up to enhance self-esteem, reduce depression, and promote happiness among pregnant adolescents.

Study Aim and Hypothesis

The aim of this study was to compare happiness and depression in an experimental group receiving the self-esteem enhancement program (SEEP) and a control group receiving usual care. We hypothesized that the mean happiness score in the experimental group after participating in the SEEP would be significantly higher, and the depression score would be lower than that in the control group.

Methods

Design: This study was a randomized controlled trial with two groups and a pre-test and post-test design. We followed the CONSORT 2010 guidelines when writing this report.

Sampling and Setting: This study included pregnant adolescents receiving prenatal care at a community hospital in southern Thailand. The inclusion criteria were: aged between 10 and 19 years old, at 14 to 20 weeks of gestation, and having mild to moderate depression (a score of 16-20 indicating mild depression and 21-30 indicating moderate depression) as measured by the Depression Questionnaire (CESD-10), having no hearing or vision impairments, being able to use the LINE application, being able to participate throughout the study, having no history of mental illness, and having a BMI below 30 kg/m.^{2}

The sample size was calculated based on previous studies testing self-esteem enhancing programs with pregnant adolescents[14] and older people,[27] which reported effect sizes of 2.19 and 2.80, respectively, indicating a very large effect. Therefore, a large effect size of 0.80 was used, and the sample size was calculated using G*Power 3.1.9.4 software. With an effect size of 0.80, an alpha level of 0.05, and a power of 0.80, the required sample size was determined to be 21 participants per group. This was then increased by 20% to account for potential dropouts. Participants were consecutively enrolled from those who met the inclusion criteria after the nurses in a target hospital approached pregnant adolescents, and they were willing to participate. Of 112 eligible pregnant adolescents, 62 did not meet the criteria, so 50 were enrolled. Using a minimized randomization procedure, randomization was controlled for age, family income, and depression level. Age: Younger pregnant women were found to have lower levels of happiness and higher levels of depression than adult pregnant women.[20,33] Economic status: Pregnant women with a lower economic status or family income had lower levels of happiness and higher levels of depression than women with a higher economic status or family income.[10,20] For degree of depression (mild to moderate), pregnant women with moderate levels of depression had lower levels of happiness and higher levels of depression than pregnant women with mild depression, allowing nurses to provide tailored nursing care.[10,33] Four participants in the experimental group were withdrawn from the study due to incomplete post-test questionnaires, resulting in a final sample of 46 women. The diagram of the recruitment process is shown in **Figure 1.**

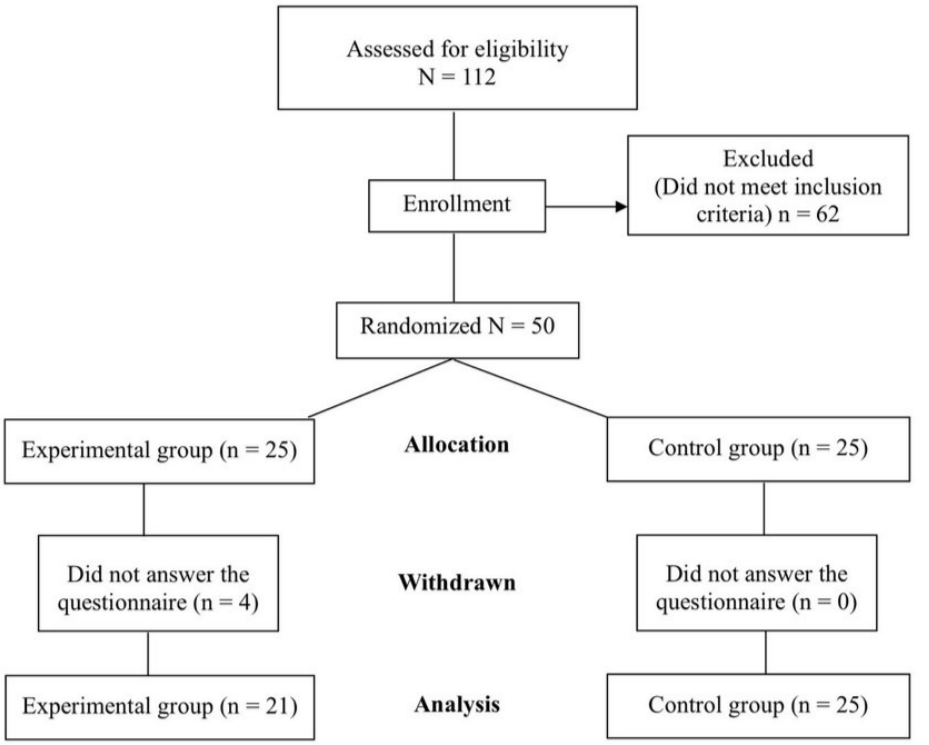

Figure 1. The recruiting process and the progress during the study

Potential biases in this study were addressed as follows: testing bias was controlled by measuring happiness and depression before and after the experiment with a 6-week interval; instrumentation bias was minimized by using a consistent, expert-reviewed questionnaire for self-esteem, happiness, and depression; and potential experimental mortality and selection biases were managed through minimized randomization to ensure sample equality, along with a 20% increase in sample size to account for potential dropouts.

Ethical Considerations: This study was approved by the Ethics Committee of the Center for Social and Behavioral Sciences, Institution Review Board, Prince of Songkla University (Code: PSU IRB 2023-St-Nur-038). In the late phase, we registered this study with the Thai Clinical Trials Registry (TCTR). The retrospective registration was approved on May 20, 2024 (TCTR20240520002). The primary investigator (PI) provided information about the study to the participants and asked for their voluntary involvement. Participants over 18 signed a consent form, and minors needed parental or guardian consent and a witness. If parents were unavailable in person, the PI obtained verbal consent from the minors' parents over the phone, with a nurse acting as a witness. Participants could withdraw from the study at any time. All information was treated confidentially. If a participant had health concerns, she was referred to an obstetrician. If the pregnancy was considered high-risk, the participant was excluded from the study without any consequences.

Instruments: Four instruments were used to obtain the data, described below:

The Demographic Characteristics Form was divided into two sections, which could be completed in a multiple-choice procedure: 1) general demographic information, consisting of nine questions on age, marital status, education level, occupation, religion, monthly family income, sufficient income, occupation, inheritance, and type of house, and 2) pregnancy history, consisting of eight questions on pregnancy planning, body mass index (BMI), number of pregnancies, number of births, current number of children, gestational age, support person, and technique used to cope with problems.

The Self-esteem Questionnaire was used to measure the self-esteem and self-acceptance of pregnant teenage women and having a good attitude toward themselves. We used Rosenberg's Self-esteem Scale (Thai version),[34] modified by Vongpradit et al.[20] Participants were asked to rate ten items on a 4-point Likert scale ranging from strongly disagree (score = 1) to strongly agree (score = 4). The total score ranges from 10 to 40; a higher score indicates higher self-esteem. An example of an item from the questionnaire is: "I feel satisfied with myself." The questionnaire was reviewed for content validity by three experts, achieving a validity index of 0.97 in a previous pilot study.[20] The Cronbach's alpha coefficient for reliability was 0.82 in a previous pilot study with 30 pregnant adolescents,[20] and 0.88 in the current main study.

The Depression Questionnaire was used to measure the level of depression in pregnant adolescents. The PI used the Center for Epidemiologic Studies Depression (the CESD-10) adapted from Kuasit et al.[33] Participants were asked to rate 20 items on a 4-point Likert scale ranging from all day (score = 0) to not at all (score = 3). The total score ranges from 0 to 60, with a score of 0-15 indicating no depression, 16-20 indicating mild depression, 21-30 indicating moderate depression, and ≥ 31 indicating severe depression. Examples of items include statements, such as "I feel irritated easily." The depression questionnaire was reviewed for content validity by three experts, achieving a validity index of 0.97 in a previous pilot study.[33] The reliability, measured using Cronbach's alpha coefficient, was reported as 0.86 in a previous pilot study involving 30 pregnant adolescents[33] and 0.89 in the current main study.

The Happiness in Pregnancy Questionnaire (HPQ) was adapted by Uttasuradee et al.[17] Participants were asked to rate 19 items on a 4-point Likert scale ranging from "very" (score = 4) to "not at all" (score = 1). The total score ranges from 19 to 76; a higher score means more

happiness. An example of an item is: "I feel like a lucky person." The HPQ was tested for content validity by three experts, achieving a validity index of 1.00. The reliability, measured using Cronbach's alpha coefficient, was reported as 0.86 in a previous pilot study with 30 pregnant women,[17] 0.90 in the pilot sample of pregnant adolescents in this study, and 0.95 in the current main study.

The Self-esteem Enhancement Program (SEEP)

The 6-week SEEP is a set of nursing interventions and participant activities developed based on Rosenberg's theory of self-esteem[16] and related studies on self-esteem enhancement. The SEEP consists of five key activities: understanding self-esteem, positive self-talk, practice favorite skills, mindset modification and reflection on self-vision (**Appendix, Table A1**). To support participants, the PI created an e-book called "How to Promote Self-Esteem" which is available through a messaging app. Pregnant teenagers can easily access the book and learn from it. A LINE chat called "My Self-Esteem" also provided support and encouragement. Participants could share their experiences and challenges and receive advice from the nurses. However, a potential limitation is that participants must have access to communication equipment, be able to use the internet, and have a communication channel through the LINE application. The accuracy of the content of the SEEP was assessed by three experts in maternal and infant nursing, mental health nursing, and psychiatric nursing. The program's content validity was deemed excellent, with a CVI score of 1.00. The experts suggested some changes to the program, such as improving the follow-up, adding individual reflection activities, and ensuring the accessibility of the technology. The electronic-book (e-book) was revised to make it more suitable for pregnant adolescents. The content was shortened and made more concise, and the font size was standardized for better readability. The CVI of the e-book was 0.93. The contact channel "My Self-Esteem" was expanded to provide additional support options.

Usual care refers to the routine nursing services offered to pregnant adolescents in a prenatal clinic. This includes health exams, medical history, physical exams, pregnancy tests, stress assessments, blood and urine tests, dental exams, immunizations, iron and calcium supplements, education on behavior and abnormal symptoms, and attending parenting classes two times.

Data Collection: After the IRB approval, the ANC nurse approached the pregnant adolescents and then the PI recruited those who met the inclusion criteria. A single-blind technique was used to declare that the data collector did not know the participant group. The PI informed the study details to the participants before asking them to sign the informed consent form. Participants in both groups completed pre-test questionnaires before receiving either the self-esteem program or usual care. The PI informed the experimental group about the program. After six weeks, both groups completed an online post-test questionnaire. This study was conducted from January to May 2024.

Data Analysis: The data analysis was done using the software program SPSS, version 25.0. The differences in the demographic data between the control and experimental groups were evaluated using the chi-square test, likelihood ratio, and independent t-test. Before conducting statistical analyses, the assumptions for the independent t-test and paired t-test were evaluated. Normality was satisfied with depression, self-esteem, and pretest happiness scores, with no violations of homogeneity or variance. A paired t-test was used to compare mean scores before and after the intervention, and an independent t-test was applied for group comparisons. Posttest happiness scores, which did not meet the normality assumption, were analyzed using the Mann-Whitney U test collaborated on for between-group comparisons and the Wilcoxon signed rank test for within-group changes. Although posttest depression scores were normally distributed, they violated the homogeneity of variance assumption, requiring a test that does not assume equal variances. These methods ensured appropriate analysis based on data characteristics. A significance level of 0.05 was set. The per-protocol analysis was used as it was less likely to induce bias because analyzing demographic

characteristics and the pre-test of dependent variables, whether with or without excluded participants, showed no differences between an experimental group and a control group, in which it confirmed no artifact selection bias.[35]

Results

Participant Characteristics

The average age of the participants in both groups was around 17 years and most were married housewives with no previous health problems. The experimental group mainly came from single-family households, while the control group mainly came from large families. A higher percentage of the control group reported unplanned pregnancies than the experimental group. Chi-square tests and independent t-tests were conducted to compare the demographic characteristics of the two groups, with the results showing no significant differences in these factors, except for the number of pregnancies, which showed a significant difference (**Tables 1** and **2**).

Table 1. Demographic characteristics of participants (N = 46)

General information	Experimental group (n = 21)		Control group (n = 25)		t/χ^2	p-value
	n	%	n	%		
Age (years)					0.47[a]	0.638
Mean (SD)	17.33 (1.71)		17.56 (1.53)			
Range	13-19		14-19			
Marital status					5.31[b]	0.070
Single	7	33.30	6	24.00		
Married/Couple	14	66.70	15	60.00		
Widowed	0	0.00	4	16.00		
Education level					0.70[c]	0.403
Primary school	3	14.30	6	24.00		
High school	18	85.70	19	76.00		
Religion					0.71[c]	0.401
Buddhism	10	47.60	15	60.00		
Islam	11	52.40	10	40.00		
Family income /month THB (US$)					0.97[a]	0.338
Mean	17,238 (478.83)		19,200 (533.33)			
SD	6,662 (185.06)		7,000 (194.44)			
Min	10,000 (277.78)		8,000 (222.22)			
Max	35,000 (972.22)		35,000 (972.22)			
Sufficiency of income					0.32[c]	0.571
Enough	10	47.60	14	56.00		
Not enough	11	52.40	11	44.00		
Occupation					0.66[b]	0.718
Housewife	11	52.40	11	44.00		
Student	4	19.00	4	16.00		
Sales/Personal business	6	28.60	10	40.00		
Underlying disease					N/A	
No	21	100.00	25	100.00		
Yes	0		0			
Type of family structures					0.32[c]	0.571
Single	11	52.40	11	44.00		
Nuclear	10	47.60	14	56.00		

[a] = Independent t-test, [b] = Likelihood ratio, [c] = Chi-square test, N/A = Not Applicable

Table 2. Comparisons of pregnancy data of pregnant adolescents between the experimental group and the control group (N = 46)

Pregnancy history	Experimental group (n = 21)		Control group (n = 25)		t/χ^2	p-value
	n	%	n	%		
Pregnancy planning					2.94[a]	0.087
Planned	12	57.10	8	32.00		
Unplanned	9	42.90	17	68.00		
BMI (kg/m^2)					0.31[b]	0.755
Mean (SD)	23.94 (3.72)		24.25 (2.92)			
Range	16.97-29.68		18.56-29.52			
Number of pregnancies					6.28[c]	0.043
First time	13	61.90	20	80.00		
Second time	8	38.10	3	12.00		
Third time	0	0	2	8.00		
Number of births					4.16[c]	0.125
None	15	71.40	20	80.00		
One	6	28.60	3	12.00		
Two	0	0	2	8.00		
Current number of children					4.43[c]	0.109
None	16	76.20	21	84.00		
One	5	23.80	2	8.00		
Two	0	0	2	8.00		
Gestational age (weeks)					1.14[b]	0.257
Mean (SD)	16.84 (1.95)		17.42 (1.46)			
Range	13.00-19.43		14.28-19.14			
Confidant					4.69[c]	0.096
Parents	14	66.70	11	44.00		
Husband	6	28.60	14	56.00		
Friend	1	4.80	0	0.00		
Method to deal with problems					3.66[c]	0.161
Do other activities	5	23.80	11	44.00		
Consult others	16	76.20	13	52.00		
Do nothing	0	0.00	1	4.00		

[a] = Chi-square test, [b] = Independent t-test, [c] = Likelihood ratio, BMI = Body mass index

Effects of the Self-Esteem Enhancement Program

At the beginning of the data collection, no significant differences were found between the two groups in self-esteem, happiness, or depression ($p > 0.05$). The hypothesis tests showed that the pregnant adolescent who had participated in the SEEP had a significantly higher mean happiness score after the experiment than before the experiment ($Z = -4.03$, $p < 0.001$). Pregnant adolescents who participated in the program had a significantly lower mean depression score after the experiment than before the experiment ($t = -21.26$, $p < 0.001$). Program participants had a significantly higher mean happiness score after the experiment ($Z = -5.62$, $p < 0.001$) and a significantly lower mean depression score after the experiment than those who received usual care ($t = -12.87$, $p < 0.001$) **(Tables 3 and 4).**

Table 3. Comparisons of the mean values for self-esteem, depression, and happiness of pregnant adolescents before and after the experiment between the experimental and control groups (N = 46)

Variables	Experimental group (n = 21)	Control group (n = 25)	t	p-value
	M (SD)	M (SD)		
Self-esteem				
Pre-test	24.14 (1.77)	23.92 (2.18)	0.38[b]	0.709
Post-test	34.71 (1.95)	25.36 (2.31)	14.68[b]	< 0.001
t	19.68[a]	2.59[a]		
p-value	< 0.001	0.016		
Depression				
Pre-test	22.48 (4.09)	21.92 (4.19)	0.45[b]	0.652
Post-test	7.38 (1.88)	19.52 (4.24)	-12.87[b]	< 0.001
t	-21.26[a]	-5.51[a]		
p-value	< 0.001	< 0.001		
Happiness				
Pre-test	46.67 (2.27)	47.00 (2.74)	-0.45[b]	0.654

[a] = Paired t-test, [b] = Independent t-test

Table 4. Comparisons of happiness scores of pregnant adolescents before and after intervention in each group and between groups using nonparametric tests (N = 46)

Variables	N	Mean rank (Sum of ranks)	Z	p-value
Happiness (pretest-posttest)				
Experimental group			-4.03[a]	< 0.001
Negative ranks	21	11.00(231.00)		
Positive ranks	0	0.00(0.00)		
Ties	0			
Control group			-4.12[a]	< 0.001
Negative ranks	22	11.50(253.00)		
Positive ranks	0	0.00(0.00)		
Ties	3			
Happiness (posttest)				
Experimental group	21	35.60(747.50)	-5.62[b]	< 0.001
Control group	25	13.34(333.25)		

Note. [a] = Wilcoxon signed ranks test, [b] = Mann-Whitney U test

Discussion

Pregnant adolescents attending the SEEP demonstrated a statistically significant improvement in happiness scores, thus confirming the study's hypotheses. An explanation for this is that promoting self-esteem among pregnant women contributes to their overall happiness. As Rosenberg[16] explains, self-esteem is fundamentally linked to self-respect and directly impacts a person's happiness. According to this theory, individuals with high self-esteem are generally happier than those with low self-esteem. High self-esteem

promotes optimism, helps individuals to recognize opportunities and gives them hope. It also empowers them to confidently express their thoughts with others in daily life and trust their abilities. People with high self-esteem often have good communication skills, build positive relationships and maintain good mental health, leading to greater happiness and satisfaction. Therefore, effective educational interventions and planning are crucial in supporting pregnant adolescents. In addition, the knowledge can be reviewed multiple times as part of the program activity, providing pregnant women with hands-on experiences. The activities within the program are designed to encourage pregnant adolescents to think analytically, synthesize information, and process it effectively. This approach results in improved learning outcomes and more effective practice. This aligns with the study by Garaipoom and Singhwee,[36] which found that applying Rosenberg's theory of self-esteem as a framework for arts activities within a program led to increased satisfaction scores among the participants.

Training pregnant adolescents in positive self-talk helped them understand the connection between their words and the positive thoughts in their minds. This, in turn, positively affects their behaviors and feelings. When a pregnant woman chooses phrases that are appropriate and beneficial for herself, it strengthens her self-image and contributes to her overall happiness. Positive self-talk has been shown to trigger the release of endorphins. Then, natural mood-boosting chemicals provide happiness, relaxation, and well-being.[9,23] Consequently, higher self-esteem leads to greater happiness. This finding is consistent with the study by Punsuwun et al.,[9] which demonstrated that positive self-talk can enhance the psychological well-being of pregnant adolescents when they face challenges.

In addition, teenagers are at a stage where they are experiencing significant emotional changes and are seeking guidance and support. Implementing a self-esteem building program with a two-way communication channel through the LINE application allowed pregnant adolescents to reach out to the researchers when they needed help or advice or simply wanted to share their experiences. This approach promotes positive change and better self-care, which can contribute to higher levels of happiness. This finding is supported by a study[14] that found using the LINE communication channels encouraged pregnant adolescents to engage in better self-care behaviors than those who did not use the LINE application.

Regarding effects of the SEEP on depression, results indicated that the program significantly reduced depression within six weeks of completion. The results also showed that the program participants had lower depression scores, on average, after the study than before and compared with the group receiving usual care. These results support the research hypothesis. Pregnant adolescents who participated in the program based on Rosenberg's theory of self-esteem[16] showed a decrease in depression. According to this theory, higher self-esteem is achieved when the individual is evaluated positively in various ways, such as being perceived as capable, useful and respectable. The program encouraged pregnant adolescents to have a more positive attitude and boosted their self-esteem by motivating them to pursue their goals and achieve success. The feeling of being capable and valuable strengthens their self-image. Boosting self-esteem can effectively reduce depression.[11]

Pregnant adolescents received communication and education services through the LINE application, a popular and widely used platform. LINE's two-way communication feature fosters a supportive, ongoing, and interactive connection with friends or caregivers. The application accommodates various forms of communication, including text, photos, and videos,[15] allowing effective interactions between messengers or medical staff and the pregnant women.[37] The study findings show that young people are highly skilled in using technology.[38] This activity encourages individuals to engage in skills and hobbies they excel at and enjoy,

supporting pregnant women in building self-esteem, which can have a beneficial effect on dopamine levels in the body. Dopamine, a neurotransmitter produced by the brain and nerve cells, enhances feelings of satisfaction and happiness, and elevated dopamine levels may reduce symptoms of depression.[23,39] For example, study participants undergoing cognitive adaptation reported lower depression levels following the intervention.[39] Although this study primarily involved older adults, the results appear to apply broadly across different age groups.[39] Consequently, by emphasizing self-esteem and promoting positive thinking and behavioral changes, the program can assist pregnant adolescents in reaching their goals and improving overall well-being. Previous studies have demonstrated that promoting self-esteem has a positive effect on depression, and this study supports these findings by enhancing self-esteem through education.[11] As a result, pregnant women who received this educational intervention exhibited lower levels of depression and higher self-esteem compared to those who did not receive such education.[8,9,32] This is consistent with a study[40] showing that promoting self-esteem can prevent and reduce depression in pregnant adolescents. In addition, another study[20] found that self-esteem is negatively associated with depression.

Regular support and stimulation can make pregnant women feel that they always have a friend by their side. Serotonin, secreted by the brain, acts as an antidepressant that affects muscle function, emotions, and behavior.[9,23] Increased serotonin levels can help prevent and reduce depression[40] and this leads to greater self-confidence in pregnant women and encourages them to be honest and seek help when needed. Such support allows them to deal effectively with various problems, thereby preventing and reducing depression. Consequently, the PI stimulated and monitored the participants through the self-esteem program and used the LINE chat channel to facilitate continuous participation and activity.

After the experiment, the control group demonstrated an increase in happiness scores, which stabilized at a moderate level, alongside a decrease in depression scores. However, these still indicated a level consistent with depression. This outcome may be attributed to the standard nursing care they received; despite being in the control group, healthcare providers observed and attended to them in line with antenatal clinic guidelines.

Our study found that pregnant adolescents benefit from feeling supported and receiving ongoing advice. A self-esteem enhancement program that includes positive reinforcement, continuous stimulation, and follow-up can increase satisfaction and decrease depression. Pregnant teens' bodies naturally produce substances that can boost happiness and reduce depression. This results in pregnant adolescents having fewer treatment steps, having more confidence in receiving prenatal care services and being able to behave appropriately during pregnancy. A successful self-esteem program can enhance the production of these substances, positively impacting both the mother and her fetus.

Limitations

Although our self-esteem enhancement program, delivered through the LINE application platform, demonstrated positive results, these should be interpreted cautiously due to several potential limitations. First, all outcome variables were cognitive-based constructs and were measured using self-report questionnaires, which were inherently prone to response bias even when blinded collectors collected data. Second, we utilized a per-protocol (PP) analysis rather than an intention-to-treat (ITT) analysis. While the PP analysis allows for evaluating the intervention's effects on participants who completed the program and all outcome measures, it may lead to overestimation of the SEEP's effectiveness due to excluding cases with incomplete data.

Third, the 6-week duration of the self-implementation program may discourage pregnant women from continuing the activities and long-term follow-up. Integrating the program into routine prenatal care and having nurses facilitate its implementation in a prenatal clinic could provide greater motivation and support, enhancing program effectiveness. It is worth noting that previous studies have shown that shorter interventions, such as a 4-week program, yielded no difference between the two groups for depression.[33] Thus, the extended 6-week duration in the current study was designed to address this limitation. However, with this extension, further investigation is needed to observe the sustainability of the program's effectiveness. Fourth, while using an e-book and the LINE application for communication has advantages, such as accessibility and convenience, participants must have a device with internet access and a LINE account, which could restrict the sample size and exclude certain demographics, such as pregnant adolescents from lower socioeconomic status or those with limited digital literacy. Overall, the program is promising, but adjustments in implementation and participant requirements may be needed to improve its effectiveness and reach.

Conclusions and Implications for Nursing Practice

The Self-esteem Enhancement Program is effective for pregnant adolescents, primarily due to its accessible media format and its focus on boosting self-esteem. This program can aid those with mild to moderate depression or serve as a preventive measure against depression. However, communication about the program needs improvement. Future research should explore implementing the program earlier in pregnancy, examining its impact on other groups of pregnant women, and assessing its effects on stress, anxiety, and family dynamics. Midwives can adopt the SEEP to facilitate activities aimed at supporting pregnant adolescents with mild to moderate depression or preventing depression, ultimately enhancing their mental health during pregnancy.

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Appendix

Table A1. Steps for implementing the Self-Esteem Enhancement Program

Time (week)	Intervention steps and objective	Activity
The first time: Meeting pregnant adolescents at the prenatal clinic		
Week 1 Initial sample group	**Step 1:** Building a relationship (30-40 min): To build trust and increase friendliness and contact channels	- Building a relationship - Introducing the SEEP
Week 1 The next day until 1 **week**	**Step 2:** Specific self-esteem activities include feeling like a good person, competent, and useful	**Activity 1: Understanding self-esteem.** This includes the meaning of self-esteem and how to practice to promote self-esteem.
Week 2 **(Day 1-7 in 1 week)**	**Step 2:** Specific self-esteem (continued)	**Activity 2: Positive self-talk:** Telling yourself good things (Practice every day for 1 week)
Week 3 **(Day 1-7 in 1 week)**	**Step 2:** Specific self-esteem (continued)	**Activity 3: Practice favorite skills:** Making feel capable and useful (Practice every day for 1 week)
Week 4 **(Day 1-7 in 1 week)**	**Step 3:** Self-esteem as a global: To get new good ideas and feel better about yourself	**Activity 4: Mindset modification:** Encouraging replacing old, distressing thoughts with new, positive ones that foster happiness (Practice every day for 1 week)
Week 5 **(Day 1-7 in 1 week)**	**Step 3:** Self-esteem as a global (continued)	**Activity 5: Reflection on self-vision:** Encouraging to write an appreciative description of their overall self-image throughout the activity, enhancing self-esteem (1 time in total)
Week 1-5 **(Every week)**	**Step 4:** Motivate and follow up continuously: To feel safe and secure, like always having a friend by your side	- Supporting and encouraging them to practice continuously every 1 week
The second time: Meeting with pregnant adolescents by LINE's open chat (30-40 min)		
Week 6 (Day 1-7 in 1 week)	- Providing the results from the LINE Open Chat activity titled "My Self-Esteem" - Conducting and submitting the post-test for the following: 1) the Happiness in Pregnancy Scale, 2) The Self-Esteem Scale, and 3) The Depression Scale (Google Forms)	

ผลของโปรแกรมส่งเสริมความรู้สึกมีคุณค่าในตนเองต่อความสุขและภาวะซึมเศร้าในหญิงตั้งครรภ์วัยรุ่น : การวิจัยทดลองแบบสุ่มและมีกลุ่มควบคุม

ศุภลักษณ์ โชครักษ์ โสเพ็ญ ชูนวล ศศิธร พุมดวง*

บทคัดย่อ: ความรู้สึกไม่มีความสุขและภาวะซึมเศร้าเป็นสิ่งที่มักเกิดขึ้นกับหญิงตั้งครรภ์ในช่วงการตั้งครรภ์ ภาวะซึมเศร้าส่งผลกระทบในทางลบต่อวัยรุ่นตั้งครรภ์ วัตถุประสงค์ของการวิจัยทดลองแบบสุ่มและมีกลุ่มควบคุม เพื่อศึกษาผลของโปรแกรมส่งเสริมความรู้สึกมีคุณค่าในตนเองต่อความสุขและภาวะซึมเศร้าของหญิงตั้งครรภ์วัยรุ่น กลุ่มตัวอย่าง คือ หญิงตั้งครรภ์วัยรุ่นที่เข้ารับบริการฝากครรภ์ที่คลินิกฝากครรภ์โรงพยาบาลชุมชนแห่งหนึ่งในภาคใต้ของประเทศไทย ระหว่างเดือนมกราคม ถึง เดือนพฤษภาคม พ.ศ. 2567 ใช้โปรแกรมมินิไมแรนดอมไมเซชัน ในการสุ่มกลุ่มตัวอย่างเข้ากลุ่มทดลองและกลุ่มควบคุมเพื่อควบคุมตัวแปรกวน โดยกลุ่มทดลองได้รับโปรแกรมส่งเสริมความรู้สึกมีคุณค่าในตนเอง (n = 21) และกลุ่มควบคุมได้รับการพยาบาลตามปกติ (n = 25) เครื่องมือที่ใช้ในการวิจัย คือ 1) แบบสอบถามข้อมูลส่วนบุคคลของกลุ่มตัวอย่าง 2) แบบประเมินความรู้สึกมีคุณค่าในตนเอง 3) แบบสอบถามภาวะซึมเศร้า CESD-10 และ 4) แบบสอบถามความสุขขณะตั้งครรภ์ วิเคราะห์ข้อมูลด้วยสถิติพรรณนา สถิติทีคู่ สถิติทีอิสระ สถิติทดสอบวิลคอกซัน และสถิติทดสอบแมนวิทนีย์

ผลการศึกษาครั้งนี้แสดงให้เห็นว่า หญิงตั้งครรภ์วัยรุ่นในกลุ่มทดลองมีคะแนนเฉลี่ยด้านความสุขเพิ่มขึ้นอย่างมีนัยสำคัญ และคะแนนภาวะซึมเศร้าลดลงหลังจากเข้าร่วมโปรแกรมส่งเสริมความรู้สึกมีคุณค่าในตนเอง เมื่อเปรียบเทียบกับคะแนนก่อนเข้าร่วมโปรแกรม นอกจากนี้ จากการเปรียบเทียบระหว่างสองกลุ่มหลังได้รับโปรแกรม พบว่ากลุ่มทดลองมีระดับความสุขสูงกว่าและภาวะซึมเศร้าต่ำกว่ากลุ่มควบคุมอย่างมีนัยสำคัญ ผลการวิจัยนี้แสดงให้เห็นว่า โปรแกรมส่งเสริมความรู้สึกมีคุณค่าในตนเองมีประสิทธิภาพในการเพิ่มความสุขและลดภาวะซึมเศร้าในหญิงตั้งครรภ์วัยรุ่น ดังนั้น พยาบาลและผดุงครรภ์ควรนำโปรแกรมที่มีคุณค่านี้ไปใช้เป็นแนวทางในการดูแลหญิงตั้งครรภ์วัยรุ่น อย่างไรก็ตาม ควรมีการทดสอบโปรแกรมนี้ในวงกว้างก่อนบูรณาการนำไปใช้

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คำสำคัญ: ระยะตั้งครรภ์ ภาวะซึมเศร้า ความสุข หญิงตั้งครรภ์วัยรุ่น โปรแกรมส่งเสริมความรู้สึกมีคุณค่าในตนเอง

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