Effectiveness of an Early Depression Prevention Program on Coping Skills and Depression among Pregnant Adolescents: A Randomized Controlled Trial

Sunetr Boobpamala, Puangpaka Kongvattananon, Mary T. Quinn Griffin*

Abstract: Depression in pregnant adolescents can be found from the prenatal to the postpartum period and affects both mother and child. Depression can also cause severe postpartum complications. This randomized controlled trial aimed to test the effectiveness of the Early Depression Prevention Program on coping skills and depression during the antenatal period among adolescents. This program promoted social support and self-esteem under the empowerment process depending on the needs of the participants. Seventy-two participants, aged 15-19-years-old attending an antenatal clinic in northeastern Thailand were recruited and randomly assigned to an experimental (n = 36) or control group (n = 36). The experimental group received the intervention program in addition to usual care. The control group received usual care only. The data collection instruments were the Antenatal Depression Scale and the Coping Skills Scale. One-way Repeated Measures ANOVA was used to analyze data.

The results revealed that, after completing the intervention, the mean depression scores of participants in the experimental group were significantly lower, whereas the coping skill scores were significantly higher than before receiving the program. Moreover, the mean depression scores in the experimental group were statistically lower than the control group over time and the mean coping skill scores were statistically higher than the control group at Week 11. Therefore, nurses and midwives can use this program to promote coping skills and prevent depression during pregnancy in adolescents. However, further testing of the effectiveness in other parts of Thailand is needed.

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Introduction

Pregnancy in adolescents is a global problem that occurs in high-, middle- and low-income countries.[1] In developing countries, approximately 12 million female adolescents aged between 15 and 19, and at least 777,000 girls under 15 years give birth each year.[1] A report by the WHO showed that approximately 90% of adolescents aged between 15 and 19 subsequently become

pregnant.[2] In Thailand, adolescent pregnancy is ranked among the top three countries in Southeast Asia.[3] The rate among adolescents aged 15-19 years increased from 50.1 per 1,000 female adolescents in 2009 to 53.4 per 1,000 female adolescents in 2012.[4] In 2018, the Bureau of Reproductive Health reported the birth rate of female adolescents aged 15-19 was 35 per 1,000 in 2018.[4] The birth rate requirement for Thai female adolescents in 2020 was no more than 34 per 1,000 for ages from 15 to 19 and 1.1 per 1,000 for ages from 10 to 14.[4]

Adolescent mothers aged 10-19 years face higher risks of eclampsia, puerperal endometritis, and systemic infections than women aged 20 to 24 years.[1] And babies of adolescent mothers face higher risks of low birth weight, preterm delivery and severe neonatal health conditions.[1] The psychological effects are evident, and a number of studies showed that adolescent mothers experience significantly higher rates of depression during the prenatal and postpartum periods than adult mothers and their non-pregnant peers.[5] In fact, the depression rate among adolescent mothers is estimated at 16 to 44%, while the lifetime prevalence of major depression among adolescents without pregnancy and adult women is from 5 to 20%.[5] Three studies in Thailand found the prevalence of depression among adolescents with pregnancy aged 10 to 19 years to be 20.6%,[6] 46% in those aged 13-19 years,[7] and 19.82%.[8]

Depression is a serious symptom that negatively affects a person's feelings, thoughts and actions, thereby leading to a variety of emotional and physical problems potentially decreasing a person's ability to function at home and in the workplace.[9] Depressive symptoms during pregnancy not only affect pregnant women, but are associated with negative outcomes for infants, including low birth weight, preterm delivery, delivery complications, low fetal growth, and poor performance on neonatal behavioral assessments.[10-11] Children of adolescent mothers with depression are found to have certain risks for delayed development, psychiatric problems and other medical problems in adulthood.[7] Thus, there is an urgent need to prevent depression in adolescents with pregnancy. This study sought to answer whether the Early Depression Prevention Program (EDPP) can increase coping skills and reduce depression during the antenatal period among adolescents with pregnancy in northeastern Thai contexts.

Conceptual Framework and Review of Literature

Among a number of theories and concepts used to guide research on promoting coping skills and depression prevention, the EDPP integrated social support theory, empowerment and self-esteem concepts. Self-esteem comprises two distinct dimensions: competence and self-worth. The competence dimension is the degree to which people perceive self-efficacy. The self-worth dimension is the degree to which people perceive they are valued.[12] Social support theory includes emotional, instrumental, informational, and appraisal support.[13] Family support can induce self-worth according to the main sources people use to judge self-worth (power, significance, virtue, and competence).[14] In addition, empowerment concepts in nursing represent a social process of recognition that promotes and enhances the ability to meet personal needs. It involves mobilizing necessary resources to create a sense of control over personal life.[15] Therefore, the empowerment process can promote problem-solving ability.

Literature evidences that promoting high self-esteem is strongly required to prevent depression among pregnant adolescents in addition to family support though coping skills.[10,16-20] Several factors are involved in the etiology of depression during pregnancy, e.g. lack of family and spousal support,[21-22] inadequate self-esteem, barriers to accessing health services, including social stigma perspective

issues,[6-7,23] and unreadiness for pregnancy, combined with having the pregnant adolescent play a role.[24] Health care workers are key providers of education during pregnancy, including counseling for problem adjustment,[10,17-18,25-26] coping skills, cognitive function, and behavioral efforts aimed at handling the demands of specific situations appraised as stressful.[27] Accordingly, people with the ability to select and implement an appropriate coping response could serve as a source of resilience, buffering expectant mothers and their children from the potentially harmful effects of prenatal stress.[28] Pregnant adolescents with good coping skills have less stress, anxiety, and risk for depression.[10]

However, this is especially true when most existing theories are applied in the contexts of Western countries. Unfortunately, programs developed in the West do not suit the Thai cultural context. Most studies in Thailand are focused on the factors related to antenatal depression and preventing postpartum depression.[6-8] Therefore, the EDPP focuses on the family enhancing self-esteem, which depends on the needs for promoting coping skills and reducing depression during the antenatal period among pregnant adolescents. Therefore, coping skills were the proximal outcome of this program. Moreover, to succeed in enhancing self-esteem and coping skills, nurses should be aware of related factors and able to properly manipulate them. The EDPP identifies the need for education about self-care during pregnancy. Thus, this intervention was guided by social support theory, self-esteem and empowerment concepts based on the needs of pregnant women.

Hypothesis

After receiving the EDPP, the experimental group would have higher mean coping skill scores and lower mean depression scores than the control group at each time period and before receiving the intervention.

Methods

Design: This study was a randomized controlled trial (RCT) with a 2-group, pretest-posttest research design. The writing of this report followed the CONSORT 2010 checklist of information to include when reporting a randomized trial.

Study setting: This study was conducted at the antenatal care clinics of three hospitals in the northeastern region of Thailand. The participants were pregnant adolescents attending an antenatal care clinic.

Sample: The sample size was calculated by the G power program (Version 3.1.9.4) that uses statistical significance at the level .05, power of the test at 0.80 and in a new instrument used the effect size at 0.25.[29] The sample size needed for this study was 33 participants in each group, then 20% was added to compensate for dropouts during the program, bringing the total sample required to 40 participants per group. The inclusion criteria included 1) female adolescents aged 15-19 years with gestational ages not exceeding 26 weeks, 2) having family, relatives or friends to take care of them during pregnancy, 3) attended at an antenatal clinic in northeastern Thailand, 4) able to comprehend and communicate in the Thai language, and 5) having the ability to provide information. The exclusion criteria were 1) adolescents with pregnancy currently receiving mental health services, 2) diagnosed as psychotic by a psychiatrist, and 3) initial depression scores exceeding 22 (Center for Epidemiologic Studies-Depression Scale: CES-D). A total score exceeding 22 is considered depression requiring diagnosis and further assistance.[30]

Sampling: Multi-stage random sampling was used to select the study population as follows: First, stratified random sampling was used to select the population from 20 provinces in northeastern Thailand, which could be divided into three groups based the birth rates of adolescents with pregnancy

aged 15-19 years: 1) ≥ 2,000 per year (2 provinces); 2) 1,000-1,999 per year (8 provinces) and 3) <1,000 per year (10 provinces). Second, three provinces were randomly selected from three groups by using simple random sampling to select the provinces in each group: Province 1, Province 2, and Province 3 from Groups 1, 2, and 3, respectively. Province 1 had 2 general hospitals, while Provinces 2, and 3 had 1 general hospital each. Third, simple random sampling was used to select one general hospital in each province. Therefore, three general hospitals were selected. Fourth, proportional stratified random sampling was used to calculate the sample size at each hospital, depending on the birth rates in each group. Proportionally, the participants were allocated to 1) Hospital 1; 40 participants 2) Hospital 2; 24 participants, and 3) Hospital 3; 16 participants. Fifth, the participants were selected at the antenatal care clinics of each hospital based on the inclusion criteria, which yielded the following: Hospital 1; 38 participants; Hospital 2; 24 participants, and Hospital 3; 16 participants. Then the potential participants at each hospital were matched by age, gravidarum, gestational age, planned/unplanned pregnancy and spouse cohabitation, and randomly assigned to the experimental or control group equally. This program was conducted for 7 weeks and after 11 weeks; 72 adolescents with pregnancy were analyzed, 36 from the experimental and control groups each (see **Figure 1**).

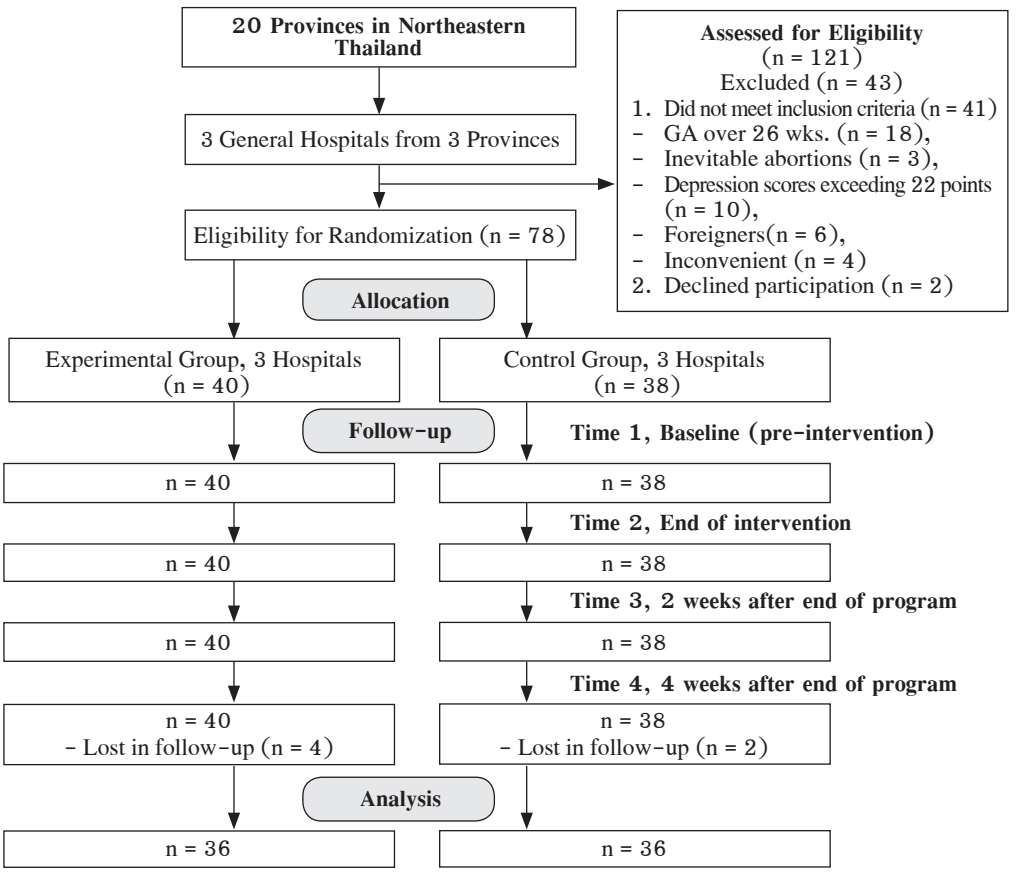

Figure 1 - Flow diagram of the participants in the study

Ethical considerations: This study was approved by the Ethical Review Sub-Committee Board for Human Research Involving Sciences, Thammasat University, No. 3 (IRB No. 092/2563, October 7, 2020). Written consent forms were obtained from the participants prior to the data collection. For participants aged less than 19 years old, parents had to sign for study consent. There was no harm or risk involved with participation in this study. The participants' information was kept anonymous. The PI looked closely for any changes during the program. If the PI found any of the participants with EPDS ≥11, they were referred to a physician in secondary care and tertiary care following the guidelines of system services for treatment. Signed informed consent and assent forms were obtained from parents and adolescents with pregnancy, respectively.

Research instruments: This study employed three questionnaires for data collection:

1. *The Socio-demographic Information* form was developed by the primary investigator (PI) and included age, gravidarum, gestational age, pregnancy planning, marital status and living with spouse, educational attainment, employment status, caregiver, feelings of anxiety, and caregiver satisfaction.

The Coping Skills Scale was developed by Lazarus and Folkman[27] then back-translated into Thai by Sitthimongkol, Kasemsakitwattana and Phongthawornkamon.[31] Patsat[31] and Kaewjanta et al.[8] modified the content for use in groups of adolescents.[31]The questionnaire was modified for use in the group of pregnant adolescents in this study. This 40-item questionnaire consists of two dimensions: problem-focused coping ("I am trying to solve a problem I am facing.") and emotion-focused coping ("I hope a miracle will happen"). The participants were asked to rate each item on a 4-point Likert scale from 0 (never) to 3 (regularly). The range of total scores was 0-120 points in which a higher score indicated more regularly used coping methods. Permission to use the instrument for this study was given by the Thai translator. The instrument was tested for its content validity by five experts (a professor in maternity-newborn and midwifery nursing, a professor in psychiatric nursing, an obstetrician, a psychiatrist and a professional nurse in maternity-newborn and midwifery). The result of CVI was .85. The internal consistency reliability was tested with 30 participants, who met the same inclusion criteria as the study participants. It yielded an acceptable Cronbach's alpha coefficient at .78 for the pilot sample, and .77 for the main study.

The Antenatal Depression Scale was developed by Cox et al.[32] then back-translated into Thai by Vacharaporn et al.[33] and permission from this Thai translator was obtained to use the instrument in this study. The questionnaire was revised to be suitable for a pregnant adolescent group before it was used in this study. This 10-item questionnaire consists of feelings for the past 7 days (e.g., "During pregnancy I have been able to laugh and see the funny side of things"). The participants were asked to rate each item on a 4-point Likert scale from 0 (never) to 3 (most of the time). The possible scoring range is 0-30, so pregnant women who obtained EPDS scores of ≥11 or a score of ≥3 on the last question were considered at risk for depression.[33] Therefore, higher scores indicate more depression. The instrument was reviewed for content validity by the above five experts. The result of CVI was .90. The internal consistency reliability was tested with 30 participants who met the same inclusion criteria as the study participants, which yielded an acceptable Cronbach's alpha coefficient at .77 for the pilot sample, and .80 for this main study.

Early Depressive Prevention Program (EDPP): The EDPP was developed from the literature review based on social support theory, self-esteem, and empowerment concepts, and the needs of the participants. Therefore, two weeks before starting program, qualitative data were collected to determine participant needs. The data revealed some of the

adolescents with pregnancy had planned pregnancies (most were married with parental consent) and required knowledge for self-care during pregnancy. On the contrary, many participants had unplanned pregnancies (most were not married) and the parents were unaware of the situation, but had faith and shame for their sins. Therefore, they had to continue their pregnancies and conceal the secret from family and society. In addition, most northeastern Thailand society view unplanned pregnancy in adolescents as a stigma.[34] Therefore, these adolescents are likely to suffer stigmatization. Furthermore, participant needs included physical and mental needs. Physical needs include self-care education by health care providers and health care services during pregnancy for adolescents and family members on discomforts and complications. In particular, the adolescents required support from mothers and spouses. Mental support required counseling from health care providers or teachers (for students) with empathy from family members during anxiety, stress, and depression.

Thus, the information on health care education participant needs were used to develop educational video clips to advise while the participants were participating in the program until delivery. The video clips consisted of the following 4 parts: 1) physical and mental changes during pregnancy; 2) self-care during pregnancy; 3) self-care in third trimester of pregnancy; and 4) complications and depressive symptoms during pregnancy.

The EDPP focuses on empowerment of the participants for problem-solving using five strategies: 1) "Open Mind" involved the discovery of reality, power checking and promotion of self-esteem; 2) "Reinforce Positive Power" was related to critical reflection and reinforcing positive power and emotional awareness; 3) "Go Together" was concerned with setting goals, emotional adjustment and commitment; 4) "Go to the Future" was the process of checking competence and reaching the destination; and 5) Evaluation was the assessment of outcomes. This program followed the empowerment process, namely discovery of reality, critical reflection, taking charge and holding on. The promotion of significance and virtue clearly occurred in strategies 2 and 3, while power and competence development were involved in every activity. The overall objective of the interventions was to increase participants' self-esteem, increase coping skills, and reduce depression. The group participating in the EDPP was 4-10 adolescents and family members, and each of the sessions took 60-90 minutes, then the participants had to practice independently. Intervention sessions were held in groups including family members. The detail of the program and activities are shown in **Table 1.**

Table 1 Program and activities for adolescents with pregnancy

Week/ Strategy Time Schedule	Objective	Activities
Preparing: 1st week pre-intervention, 30 minutes	Introduction and baseline measurement	- Participants were introduced to the intervention. - Baseline measurement depression score and coping skills (antenatal depression score, coping skill score)
Week 1 Strategies 1: Open Mind, 60-90 minutes	To analyze the feelings of the participants about their pregnancies, the PI built rapport and trust between the PI and participants	1.1 Built rapport and trust with the participants 1.2 The participants were asked about feelings, pregnancy expectations, and individual needs for help during pregnancy. 1.3 The participants expressed their feelings and critical reflections.

Table 1 Program and activities for adolescents with pregnancy (Cont.)

Week/ Strategy Time Schedule	Objective	Activities
		1.4 The participants chose a family member or close friend to help during pregnancy. 1.5 The participants were asked to recall past situations that made them proud, their strengths, weaknesses, and expectations. 1.6 The participants were encouraged to have good feelings about being a pregnant woman by a short film, "Welcome to the World of Motherhood." 1.7 Providing information related to physical and mental changes during pregnancy by the video clip, "Physical and Mental Changes during Pregnancy" 1.8 Online counseling
Week 3 Strategies 2: Reinforce Positive Power, 60-90 minutes	To construct critical reflection, reinforce positive power, promote self-esteem, provide knowledge about good practices during pregnancy and coping skills	2.1 Self-esteem was promoted by a family member or close friend with support for feelings and assessment of positive power by discussion and short films, "Would It Be Better If Someone Else Took Care of It?" and "When Have I Encountered Something like This? What Should I Do?" 2.2 The PI provided knowledge about pregnancy and self-care during pregnancy. 2.3 The participants were asked "How do you cope with stress and anxiety?" to examine their coping strategies. 2.4 The participants participated in searching for positive power. 2.5 The family members or close friends cooperated in the program and supported the participants. 2.6 The participants were educated on physical and mental changes during pregnancy with the video clip, "Self-care during Pregnancy." 2.7 Online counseling
Week 5 Strategies 3: Go Together to set Goals, 60-90 minutes	Make commitments and provide self-care guidelines. This activity also welcomed participation by family members or friends	3.1 The participants were asked the question, "How do you deal with problems?" to practice problem-solving skills based on the scenario. 3.2 The participants were trained in problem-solving skills through hypothetical situations and watching the short film, "We Will Go Together," 3.3 The participants and their family members or friends demonstrated the goals and self-care guidelines they chose together. 3.4 The participants and their family members or friends made a commitment to take care of one another until delivery.

Table 1 Program and activities for adolescents with pregnancy (Cont.)

Week/ Strategy Time Schedule	Objective	Activities
		3.5 The participants were educated on self-care during pregnancy in the third trimester with the video clip, "Self-care in the Third Trimester of Pregnancy."
		3.6 Online counseling
Week 7 Strategies 4: Go to the Future, 60-90 minutes	To check competence and reach the destination This session focused on competency assessment and planning for the future.	4.1 The participants' competence to reach set goals was assessed. 4.2 The PI provided knowledge about complications in adolescent pregnancy and depressive symptoms. 4.3 The participants were assessed for self-esteem/ pregnancy expectations (What is my expectation?), competence in reaching set goals (I can do it), feelings and adjustment for moving on. 4.4 The participants were given knowledge that met their needs. 4.5 The participants and their family members or friends developed a future plan. 4.6 The participants were educated about mental health and complications in adolescent pregnancy with the video clip, "Complications and Depressive Symptoms during Pregnancy," which focused on adolescent pregnancy. 4.7 Assessment of depression scores and coping skills 4.8 Online counseling
Week 9, 11 Strategies 5: Evaluation 15-20 minutes	To evaluate depression and feelings about pregnancy (antenatal depression/ coping skill scores)	The post intervention depression scores were evaluated at the end of program including the second and fourth weeks after the program, respectively.

The congruence between the program concepts and activities was reviewed by five experts and revised as recommended before implementation. The program was tested in a group of pregnant adolescents who attended the antenatal care clinic.

Routine/usual care - Participants received the routine care in the health system including vital signs checkups, health assessment, health education. They attended the antenatal care clinic every month until gestational age of 28 weeks, then every two weeks from 28 to 36 weeks and every week after 36 weeks until delivery. Moreover, they had an ultrasound in the second trimester and maternal classes in the first to third trimester of pregnancy.

Data collection: Data were collected during October 2020 - February 2021. After the IRB approval, the EDPP was implemented and data collected by the PI. Data collection during the program used online counseling with online data collection after the end of the program. This study applied a single-blind technique in which the participants and the staff were unaware of group assignments. The services of each hospital were not scheduled at the same time. Each hospital had equally allocated participants. The experimental group was assigned to the 7-week EDPP and received usual care. Meanwhile, the control group received usual care from the antenatal care clinics,

so each hospital in the northeastern region of Thailand provided the same care. Evaluation by questionnaire was measured four times for both groups. Two variables, coping skills and depression scores, were measured before the program and at 7, 9, and 11 weeks after the program.

Data analysis: The Statistical Package for the Social Sciences (Version 26.0) was used for data analysis. Descriptive statistics were used to describe the socio-demographic characteristics and backgrounds of participants. To compare the differences between the two groups at baseline, independent sample t-tests, chi-square statistical analyses, and Fisher's Exact test were employed. One-way repeated measures ANOVA was used to analyze the differences in the total depression and coping skill scores between groups, and repeated measures ANOVA was used to test the differences within groups among measuring intervals.

Results

Participant Characteristics

As shown in **Table 2**, the majority of participants in the experimental and control group were pregnant adolescents aged 15-19 years, gestational age at the first visit in the experimental group was 6-26 weeks and the control group 5-25 weeks. At baseline, there were no significant differences in general socio-demographic characteristics and the backgrounds between the experimental and control groups. Moreover, the independent t-test was used to compare the scores of two outcome variable measures at baseline (Week 0) **(Table 3)**. There were no significant differences of antenatal depression and mean coping skill scores between the experimental and control groups.

Table 2 Socio-demographic characteristics of the participants

Socio-demographic Characteristics	Experimental Group (n = 36)	Control Group (n = 36)	Statistical Value	*p-value*
Age (years)				
Mean (SD)	17.44 (1.46)	17.81 (1.24)	-1.13[a]	.106
Range	15-19	15-19		
Gestational age at first visit				
Mean (SD)	16.83 (6.19)	18.03 (6.06)	-0.83[a]	.788
Range	6-26	5-26		
Gravidarum				
First	32 (88.89%)	29 (80.56%)	0.97[c]	.514
Second	4 (11.11%)	7 (19.44%)		
Pregnancy planning				
Planned	6 (16.67%)	8 (22.22%)	0.36[b]	.551
Unplanned	30 (83.33%)	28 (77.78%)		
Marital status				
Single	3 (8.33%)	2 (5.56%)	0.84[c]	.686
Married-living with spouse	27 (75.00%)	30 (83.33%)		
Married-not living with spouse	6 (16.67%)	4 (11.11%)		
Employment Status				
Student	13 (36.11%)	5 (13.89%)	5.10[b]	.078
Housewife	18 (50.00%)	22 (61.11%)		
General contractor	5 (13.89%)	9 (25.00%)		

Table 2 Socio-demographic characteristics of the participants (Cont.)

Socio-demographic Characteristics	Experimental Group (n = 36)	Control Group (n = 36)	Statistical Value	*p-value*
Educational Attainment				
Grade 6 or less	5 (13.89%)	5 (13.89%)	2.37[c]	.535
Secondary school	17 (47.22%)	22 (61.11%)		
High school graduate	10 (27.78%)	5 (13.89%)		
Vocational certificate	4 (11.11%)	4 (11.11%)		
Caregiver				
Parent	15 (41.67%)	14 (38.89%)	2.75[b]	.253
Spouse	15 (41.67%)	20 (55.56%)		
Relative	6 (16.66%)	2 (5.55%)		
Anxiety				
Mild	18 (50.00%)	27 (75.00%)	5.29[c]	.151
Moderate	9 (25.00%)	4 (11.11%)		
High	7 (19.44%)	3 (8.33%)		
Highest	2 (5.56%)	2 (5.56%)		
Satisfaction in Family Care during Pregnancy				
Mild	1(2.78%)	1(2.78%)	0.43[c]	.999
Moderate	6 (16.66%)	5 (13.89%)		
High	10 (27.78%)	10 (27.78%)		
Highest	19 (52.78%)	20 (55.55%)		

Note. [a] = t-test independent, [b] = chi-square, [c] = Fisher's Exact Test

Table 3 Comparison of the mean coping skill score and depression score before and after intervention at each time point

Outcome Variables	Experimental Group (n = 36) M (SD)	Control Group (n = 36) M (SD)	SE	*p*-value
Coping Skill Score				
Time 1	64.94 (11.01)	66.08 (10.42)	2.53	.654
Time 2	69.69 (9.84)	68.33 (11.92)	2.58	.599
Time 3	70.56 (9.99)	65.61 (12.32)	2.64	.066
Time 4	73.47 (9.14)	64.39 (15.83)	3.05	.004
Depression Score				
Time 1	7.03 (4.07)	6.72 (4.04)	0.96	.750
Time 2	4.53 (2.60)	6.39 (4.28)	0.84	.029
Time 3	4.00 (2.56)	5.97 (4.02)	0.79	.015
Time 4	2.03 (2.13)	6.56 (4.55)	0.84	< .001

Effects of the EDPP

One-way repeated measures ANOVA and post-hoc analysis used the Bonferroni technique for comparing the multiple means of antenatal depression mean and coping skill scores among time points. As shown in **Table 4**, the participants in the experimental group had lower antenatal mean depression scores than the participants in the control group. At the same time, the mean depression scores of all participants in the experimental group were significantly lower than before receiving the program (**Table 6**).

Table 5 show that participants in the experimental group had no differences in mean coping skill scores from the participants in the control group at Weeks 7 and 9 (**Table 5**). Over time, however, the results showed that the interaction effect (time*group) was statistically and significantly different at Week 11 (**Table 3**). Moreover, **Table 6** shows that participants in the experimental group had higher mean coping skill scores than before starting the program. The results showed the experimental group had higher mean scores at Times 2, 3, and 4 than at Time 1 with increasing significance at each measurement. The mean score of Time 2 was statistically and significantly different from Time 1; Time 3 was statistically and significantly different from Time 1; and Time 4 was statistically and significantly different from Time 1.

Table 4 One-way repeated measures ANOVA of depression scores

Source of Variation	Type III Sum of Squares	df	Mean Square	F	*p-value*
Within Group					
Time	257.67	2.35	109.82	18.39	< .001
Group*Time	211.04	2.35	89.95	15.06	< .001
Error	980.79	164.23	5.97		
Between Groups					
Group	292.01	1	292.01	7.49	.008
Error	2,727.76	70	38.97		

Table 5 One-way repeated measures ANOVA of coping skill scores

Source of Variation	Type III Sum of Squares	df	Mean Square	F	*p-value*
Between Groups					
Group	913.78	1	913.78	2.52	.117
Error	25,434.19	70	363.35		
Within Group					
Time	578.09	2.523	229.11	3.53	.022
Group*Time	1,068.09	2.52	423.31	6.52	.001
Error	11,473.06	176.62	64.96		

Table 6 Pairwise comparisons using Bonferroni of the mean difference in total scores between each pair of time differences in the intervention and control groups (n = 36, 26)

Variable	Time	Mean Difference	Std. Error	*p-value*
Depression scores	Experimental Group			
	T1 vs T2	2.50	0.50	< .001
	T1 vs T3	3.03	0.53	< .001

Table 6 Pairwise comparisons using Bonferroni of the mean difference in total scores between each pair of time differences in the intervention and control groups (n = 36, 26) (Cont.)

Variable	Time	Mean Difference	Std. Error	*p-value*
	T1 vs T4	5.00	0.65	< .001
	Control Group			
	T1 vs T2	0.33	0.50	.503
	T1 vs T3	0.75	0.53	.163
	T1 vs T4	0.17	0.65	.799
Coping skills	Experimental Group			
	T1 vs T2	-4.75	1.43	.001
	T1 vs T3	-5.61	1.68	.001
	T1 vs T4	-8.53	2.15	< .001
	Control Group			
	T1 vs T2	-2.25	1.43	.121
	T1 vs T3	0.47	1.68	.779
	T1 vs T4	1.69	2.15	.432

Discussion

The results revealed the effectiveness of the EDPP to improve coping skills and decrease depression. The knowledge obtained from the interviewed participants showed that health education during pregnancy and providing counseling in both physical and mental care were the essential issues. This knowledge could be reviewed by themselves using clip video. In addition, various strategies based on social support, self-esteem and empower concept were used to increase self-worth, emotional adjustment and coping skills. Also, they were able to choose the form of participation in the activities by themselves, by joining in the group activities in disclosed and single cases who wanted to conceal information were tailored to meet the needs of the participants.

The crucial factors affecting the coping ability of participants are high self-esteem and support from family members, especially mothers and spouses.[6,10,16-20,35] Findings showed that family members are highly important people for providing encouragement, feelings of love, strength to fight and confidence to face various problems. Although there are many problems and obstacles, participants often face problem-solving well when provided adequate family support. Social support from family members can promote self-esteem and coping skills, which can eventually reduce depression during pregnancy. Social support and coping skills can prevent depression.[17,20] Moreover, love and understanding of family members can make a house happy and reduce the risks of depression in adolescent with pregnancy.[19] It was reported that the feelings of teenage women included loneliness, stress, and depression when their families rejected their pregnancies.[16] The findings from this study were supported by previous studies in that maternal and partner support can reduce the severity of depression,[21-22] particularly from mothers and grandmothers.[16,36]

Moreover, the EDPP provided online and telephone counseling throughout the program in private and group form which focused on participants' problems and followed up after the consultation. The participants could consult about their physical and mental health care. These strategies helped participants solve their own problem.

The activities started with building a relationship to gain trust and assess the needs for care during pregnancy in each participant. At the same time, the relationships between the participants and their families were realized, which was a guideline for taking care while participating in the program. Promoting the knowledge of proper self-care will reduce stress and anxiety while pregnancy.[18,37] The EDPP provides health care education according to the needs and convenience of the participants.

Health care providers are facilitators in family compromise and provide education during pregnancy, including counseling for problem adjustment.[10,17-18,25-26] Similarly, trust is essential for taking care of adolescents with pregnancy. If health care providers are friendly, respectful, and sincere, pregnant adolescents will trust them and dare to tell the truth, seek help, and apply it in real life.[16] Furthermore, this study used focus group discussions based on the adolescents' needs expressed in peer groups through problem-solving skills by discussion and communication.[38]

Regarding the effects of the EDPP on coping skills, the findings showed the program could enhance coping ability in 11 weeks after the program that means training them to cope effectively takes time. The behavioral modification took a long time to accomplish at each step; the need for social support, consistent with studies on behavior modification to prevent depression in the case of adolescent pregnancy, requires promotion of self-esteem and empowerment with family and social support.[39] This study was conducted according to the stages of change theory as part of the Transtheoretical Model stating the following six stages of behavioral modification: 1) pre-contemplation; 2) contemplation; 3) preparation; 4) action stage; 5) maintenance and 6) termination,[40] particularly when problems involve management during pregnancy in which symptoms can change from diagnosis of pregnancy until delivery. Therefore, practicing problem-solving also took a long time.

Findings showed that the scores of coping skills of the experimental group were significantly higher than those of the control group. As well, the depression scores were significantly lower than the control group. Therefore, the EDPP was found to enhance coping skills for preventing depression.

Limitations

The participants in this study were from northeastern Thailand, so generalization to other settings is limited. Moreover, this program may not be suitable in pregnant adolescents without relatives, friends, or close acquaintances to take care of them, because feelings of self-worth need to be promoted by such people who value the adolescents. Therefore, the participants without family members to take care of them became a barrier to the work of the program. Moreover, the EDPP was conducted, and data were collected by the PI, thus, internal validity could not be totally controlled, even though the participants answered the questionnaire via a Google form.

Conclusions and Implications for Nursing Practice

The EDPP integrating social support theory, empowerment and self-esteem concept, was found to enhance coping skills and prevent depression among pregnant adolescents. This program can be used to prevent depression and promote problem-solving ability according to the adolescents' needs. Moreover, family members, particularly spouses and mothers, are encouraged to take care of pregnant adolescents from antenatal care until delivery.

This finding encourages the antenatal care clinics to promote family members and close friends in caring for these adolescents by promoting self-esteem and enhancing coping skills to facilitate problem-solving. Moreover, the health care providers

have to provide health care education, including counseling on health issues in each trimester for self-care during pregnancy.

Nurses and midwives can use this program to enhance coping skills and reduce depression among adolescences with pregnancy. However, special upskilling is also needed for nurses. Further testing of the effectiveness of the program is required to increase generalizability.

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ประสิทธิผลของโปรแกรมป้องกันภาวะซึมเศร้าขณะตั้งครรภ์ต่อทักษะการจัดการปัญหา และภาวะซึมเศร้าของสตรีวัยรุ่นที่มีการตั้งครรภ์: การวิจัยเชิงทดลองแบบสุ่มชนิดมีกลุ่มควบคุม

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บทคัดย่อ: ภาวะซึมเศร้าพบได้ตั้งแต่ระยะตั้งครรภ์จนถึงหลังคลอด ซึ่งมีผลกระทบทั้งในมารดาและทารก ภาวะซึมเศร้าระยะตั้งครรภ์ยังเป็นสาเหตุให้ภาวะซึมเศร้าหลังคลอดมีอาการรุนแรงขึ้นได้ การวิจัยเชิงทดลองแบบสุ่มชนิดมีกลุ่มควบคุมนี้มีวัตถุประสงค์เพื่อศึกษาประสิทธิผลของโปรแกรมป้องกันภาวะซึมเศร้าในขณะตั้งครรภ์ของสตรีวัยรุ่นที่มีการตั้งครรภ์ โปรแกรมนี้มีพัฒนาขึ้นจากทฤษฎีการสนับสนุนทางสังคม ความภาคภูมิใจในตนเอง การเสริมสร้างพลังอำนาจ และความต้องการของวัยรุ่นตั้งครรภ์ในการป้องกันภาวะซึมเศร้าขณะตั้งครรภ์ กลุ่มตัวอย่างเป็นสตรีวัยรุ่นตั้งครรภ์อายุ 15-19 ปี สุ่มแบบหลายขั้นตอน ได้กลุ่มตัวอย่างทั้งหมด 72 คน ประกอบด้วยกลุ่มทดลอง 36 คน และกลุ่มควบคุม 36 คน เครื่องมือวิจัยประกอบด้วยโปรแกรมป้องกันภาวะซึมเศร้าในขณะตั้งครรภ์ แบบประเมินภาวะซึมเศร้าขณะตั้งครรภ์ และแบบประเมินทักษะการเผชิญปัญหา วิเคราะห์ด้วยสถิติความแปรปรวนทางเดียวแบบวัดซ้ำ (One-way Repeated Measures ANOVA)

ผลการวิจัยพบว่า หลังจากการเข้าร่วมโปรแกรม กลุ่มทดลองมีคะแนนภาวะซึมเศร้าเฉลี่ยลดลงในขณะที่คะแนนทักษะการเผชิญปัญหาสูงกว่าก่อนเข้าร่วมโปรแกรมอย่างมีนัยสำคัญทางสถิติ นอกจากนี้เมื่อเวลาผ่านไป คะแนนภาวะซึมเศร้าในกลุ่มทดลองต่ำกว่ากลุ่มควบคุม และในสัปดาห์ที่ 11 พบว่าคะแนนทักษะการเผชิญปัญหาสูงกว่ากลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติ ดังนั้นพยาบาลและผดุงครรภ์สามารถใช้โปรแกรมนี้เพื่อส่งเสริมทักษะการเผชิญปัญหาและป้องกันภาวะซึมเศร้าระหว่างตั้งครรภ์ในวัยรุ่น อย่างไรก็ตามจำเป็นต้องมีการทดสอบประสิทธิภาพในส่วนอื่นๆ ของประเทศไทยเพิ่มเติม

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