บทบาทของการสนับสนุนทางสังคมจากครอบครัวและผดุงครรภ์ป้องกันการเกิดภาวะซึมเศร้าหลังคลอดในมารดาวัยรุ่นได้หรือไม่? การศึกษานำร่องถึงความเป็นไปได้

Is There a Role of Social Support from the Family and Midwives to Prevent the Development of Postpartum Depression in Adolescent Mothers? A Feasibility Pilot Study

นิพนธ์ต้นฉบับ

บุศรา แสงสว่าง[1,2], วรรณี เดียวอิศเรศ[3*] และ ภรภัทร เฮงอุดมทรัพย์[1]

[1] คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา อ.เมืองชลบุรี จ.ชลบุรี 20131
[2] คณะพยาบาลศาสตร์ มหาวิทยาลัยศรีนครินทรวิโรฒ อ.องครักษ์ จ.นครนายก 26120
[3] คณะพยาบาลศาสตร์ มหาวิทยาลัยราชภัฏรำไพพรรณี อ.เมือง จ.จันทบุรี 22000
*** Corresponding author:** wannee.d@rbru.ac.th

วารสารไทยเภสัชศาสตร์และวิทยาการสุขภาพ2564;16(2):109-119.

Original Article

Bussara Sangsawang[1,2], Wannee Deoisres[3*] and Pornpat Hengudomsub[1]

[1] Faculty of Nursing, Burapha University, Muang Chonburi, Chonburi, 20131, Thailand
[2] Faculty of Nursing, Srinakharinwirot University, Ongkharak, Nakhonnayok, 26120, Thailand
[3] Faculty of Nursing, Rambhai Barni Rajabhat University, Muang, Chanthaburi, 22000, Thailand
*** Corresponding author:** wannee.d@rbru.ac.th

Thai Pharmaceutical and Health Science Journal 2021;16(2):109-119.

บทคัดย่อ

วัตถุประสงค์: เพื่อทดสอบความเป็นไปได้ ความยอมรับได้ และผลเบื้องต้นของโปรแกรมการสนับสนุนทางสังคมโดยการนำของพยาบาลต่อการป้องกันภาวะซึมเศร้าหลังคลอดในมารดาวัยรุ่น **วิธีการศึกษา:** มารดาวัยรุ่นจำนวน 27 คนถูกประเมินเข้าร่วมการศึกษา ท้ายที่สุดมีมารดาวัยรุ่น 5 คนที่มีคะแนนภาวะซึมเศร้าน้อยกว่า 13 คะแนน และผู้สนับสนุนหลักของมารดาวัยรุ่น 5 คนเข้าร่วมการศึกษา โปรแกรมนี้มีกิจกรรมสนับสนุนจากผู้สนับสนุนหลักของมารดาวัยรุ่นและพยาบาลโปรแกรมมี 4 ช่วงร่วมกับการเยี่ยมบ้านรวมเวลาทั้งหมด 4 สัปดาห์ ความเป็นไปได้ประเมินจากอัตราการเข้าร่วมและอัตราการออกกลางคัน ความยอมรับได้ประเมินจากแบบประเมินที่ผู้วิจัยพัฒนาขึ้น ใช้แบบประเมินภาวะซึมเศร้าหลังคลอดในระยะก่อนการทดลอง ระยะหลังการทดลอง (4 สัปดาห์หลังคลอด) และระยะติดตามผล (6 สัปดาห์หลังคลอด) คะแนนมากกว่า 13 คะแนนขึ้นไปบ่งชี้ว่ามารดาวัยรุ่นมีภาวะซึมเศร้าหลังคลอด วิเคราะห์ข้อมูลโดยทดสอบความแปรปรวนแบบวัดซ้ำ **ผลการศึกษา:** กลุ่มตัวอย่างทุกคนเข้าร่วมในโปรแกรมครบทุกกิจกรรม ทั้งยังรายงานว่าโปรแกรมนี้มีส่วนช่วยและมีประโยชน์ต่อการป้องกันภาวะซึมเศร้าหลังคลอด กลุ่มตัวอย่างมีความพึงพอใจต่อการเข้าร่วมโปรแกรมนี้ คะแนนภาวะซึมเศร้าหลังคลอดลดลงอย่างต่อเนื่องจากระยะก่อนการทดลองจนถึงระยะหลังการทดลอง และระยะติดตามผล (P-value < 0.001) และทั้งสามระยะต่างกันอย่างมีนัยสำคัญทางสถิติ (P-value < 0.05 สำหรับการเปรียบเทียบทั้งสามคู่) **สรุป:** โปรแกรมการสนับสนุนทางสังคมโดยการนำของพยาบาลมีความเป็นไปได้ ความยอมรับได้ และแสดงผลเบื้องต้นในการป้องกันภาวะซึมเศร้าหลังคลอดในมารดาวัยรุ่น การศึกษาครั้งต่อไปควรเป็นเชิงทดลองแบบสุ่มชนิดมีกลุ่มควบคุม และใช้ตัวอย่างจำนวนมากกว่านี้

คำสำคัญ: มารดาวัยรุ่น, ภาวะซึมเศร้าหลังคลอด, การป้องกัน, การสนับสนุนทางสังคม, การศึกษาความเป็นไปได้

Editorial note
Manuscript received in original form: May 27, 2020;
Revised: June 20, 2020;
Accepted in final form: June 22, 2020;
Published online: June 29, 2021.

Abstract

Objectives: To determine the feasibility, acceptability and preliminary effectiveness of the Nurse–Led Social Support Program (NLSS program) to prevent PPD among adolescent mothers. **Methods:** Out of 27 adolescent mothers assessed for eligibility, a total of 5 adolescent mothers who had Edinburgh Postnatal Depression Scale (EPDS) scores of < 13 points and 5 primary family members were enrolled in the program. The NLSS program is an intervention combining the support from family members of adolescents and midwives. The program consisted of four sessions with home-visit over a period of 4 weeks after childbirth. Feasibility was assessed by considering attendance and drop-out rates, and acceptability by the evaluation form developed by the researchers. PPD was assessed by EPDS with scores > 13 points at baseline, post-intervention (4-weeks postpartum) and follow-up (6-weeks postpartum). Repeated measures ANOVA were used to analyze the data. **Results:** All participants completely participated in all sessions and activities of the program. They reported the program as helpful and useful in preventing PPD and expressed satisfaction with the program. The EPDS scores decreased over from baseline to post-intervention and follow-up (P-value < 0.001) and each of the 3 pairs of comparison were significance (P-value < 0.05 for all). **Conclusions:** The findings indicated the NLSS program was feasible, acceptable and effective for preventing PPD in adolescent mothers. A randomized controlled trial with a larger sample size should be conducted.

Keywords: dadolescent mothers, feasibility study, postpartum depression, prevention, social support

Journal website: http://ejournals.swu.ac.th/index.php/pharm/index

Introduction

Adolescence is the period of transition from childhood to adulthood which is characterized by biological, psychological, and social changes. When an adolescent becomes pregnant, the psychological adjustment of pregnancy is added to the challenges in the transition from adolescence to motherhood.[1] Regarding psychosocial problems, adolescents and young mothers may be particularly vulnerable to the psychosocial distress during pregnancy and after childbirth. This is because adolescent mothers face a number of challenges such as a transition to a new maternal role and a responsibilities as a mother.[2] Moreover, adolescent mothers experience more complicated than adult counterparts during the early period after childbirth.[3] Therefore, in terms of psychosocial problems for adolescent mothers in early motherhood, a number of

studies have suggested that being an adolescent mother may be related to poorer mental health outcomes, such as psychological distress or postpartum depression.[4]

Postpartum depression (PPD), a serious mental health issue for many adolescent mothers worldwide, is defined as a major depressive disorder occurring within the first 6 months after delivery.[5,6] PPD symptoms are similar to those of major depression occurring at other times, including depressed mood, loss of interest or pleasure, guilt feeling, anxiety, irritability, sleep disturbance, disturbed appetite, low energy, fatigue, lack of or excessive concern for the baby, or suicidal ideation.[7] PPD is the most common mood disorder during the postpartum period. The rate of PPD is approximately 10 - 57% in adolescent mothers.[8,9]

PPD has significant negative consequences, not only on the adolescent mothers experiencing depression, but also on their infants. PPD adversely affects mother-infant interactions, attachment and bonding as well as infant development.[10] Depression in mothers leads to a decreased ability to interpret infant cues and interact with infants.[11] Consequently, depressed mothers are more likely to develop negative relationships with their infants, which may cause the delayed emotional and cognitive development in the infants.[12] Furthermore, depressed mothers are more likely to develop unhealthy behaviors such as excessive alcohol consumption and substance abuse, including cigarettes and illicit drugs.[13]

Lack of or inadequate social support is one of the significant psychosocial risk factors for developing PPD in mothers.[14,15] Social support is a significant source in providing assistance to all mothers, particularly in adolescent mothers, in terms of improving mental health after childbirth.[16] Additional social support during pregnancy and after childbirth may be needed for adolescent mother. Unfortunately, adolescent mothers often experience lower levels of social support or inadequate social support than non-pregnant peers and adult mothers.[17,18] Adolescent mothers who lack social support are a high-risk group for PPD.[19,20]

On the other hand, numerous studies have found that adolescent mothers who received high levels of social support were associated with less PPD after childbirth.[21,22] Therefore, increasing social support, particularly after childbirth, can reduce the development of PPD in adolescent mothers. Moreover, interventions that focus on enhancing social support after childbirth may also be helpful to reduce PPD in adolescent mothers. Social support to adolescent mothers can come from many sources. The support from family members and husband are the most important source for the new mother.[23] In addition to the support from family members, most mothers in early postpartum period felt a need for social support during their transition to motherhood from healthcare professionals such as midwives or nurses.[24,25] Therefore, several studies and meta-analysis suggested that interventions providing informational support, especially the information about PPD by a health professional immediately after childbirth had shown to be effective in reducing the risk of PPD than providing this information during pregnancy.[26-28]

Based on the abovementioned findings, the high rate and negative impacts of PPD support the crucial need for developing more effective interventions to prevent PPD. Numerous previous systematic reviews have found that several psychological and psychosocial interventions specifically targeting high-risk mothers for developing PPD are significant methods for preventing PPD in mothers. However, these systematic reviews have focused more on interventions to prevent/treat PPD in adult mothers than adolescent mothers.[26,29]

Currently, the findings from a recent systematic review of interventions to prevent PPD in adolescent mothers[30] found the majority of psychosocial interventions did not aim at increasing social support. All of the psychosocial interventions were delivered only during the pregnancy, and did not extend to the period after childbirth. Moreover, none of the interventions promoted family members such as mothers, fathers, or husbands/partners in supporting adolescent mothers during pregnancy and the postpartum period. Furthermore, this review did not find any evidence to identify the most effective intervention for preventing PPD in adolescent mothers.[30]

To the best of our knowledge, there are few published studies that focus on developing social support interventions for adolescent mothers to prevent PPD during the postpartum period. In the closest published study, Logsdon et al[31] examined the effectiveness of a social support intervention provided by nurses to 128 pregnant adolescents with 32 - 36 weeks gestation for preventing PPD at six weeks after childbirth. Nurses had a responsibility to deliver the social support intervention to the pregnant adolescents in order to enhance social support and prevent PPD. The social support intervention consisted of three interventions including a pamphlet, a video, or the combination of the pamphlet and the

video. The pamphlet had 15 pages and used 16-point font, with simple drawings and figures next to the text that was culturally sensitive. The voice was active, and the pamphlet was at a sixth-grade reading level. The pamphlet concluded with a summary of key points. The video was 8 minutes long, proceeded at a slow speed, included scene changes, and had both a narrator and dialogue. The pregnant adolescents were randomly assigned to one of the three treatment groups (pamphlet, video, and pamphlet plus video) or the control group. However, the social support intervention was limited to one dimension of social support, namely information support, and did not focus on the other dimensions of support such as instrumental, emotional, and appraisal supports. At the end of the study, the researchers found no difference in PPD scores between the experimental and the control groups at six weeks after childbirth.[31]

From above mentioned, the social support intervention that combined the support from healthcare provider and family member in early postpartum period can prevent PPD in adolescent mothers. Therefore, we conducted the current pilot study to develop a psychosocial intervention, namely a nurse–led social support program (NLSS program) covering all dimensions of social support in early postpartum period. The NLSS program is an intervention that combines the support from nurses and primary family members of adolescent mothers in the early postpartum period to prevent PPD in adolescent mothers. The results of this study would help prevent PPD in adolescent mothers. Thus, our pilot study aimed to determine the feasibility, acceptability and preliminary effectiveness of the NLSS program designed for preventing PPD in adolescent mothers.

Methods

This study used a quasi-experimental, one-group, pretest-posttest and follow-up design with no control group. Data were collected at pre-intervention and 4-week postpartum (post intervention) and 6-week postpartum (follow-up).

The study was approved by the Institutional Review Committee of the Faculty of Nursing, Burapha University (Ref. No.: 02-11-2561) and the Chonburi Hospital Research Center, Chon Buri, Thailand (Ref. No.: 22/62/O/h3).

We recruited adolescent mothers from the postpartum unit of a tertiary hospital between February and April 2019. Adolescent mothers were included in the program if they met the following inclusion criteria: age of 10 - 19 years, first-time mother, normal delivery and hospitalization at the postpartum unit for the first day, scores of < 13 on the Edinburgh Postnatal Depression Scale (EPDS),[32] and having a primary family member (husband, mother, father, or grandmother/father) to provide care and social support during the postpartum period. We also included primary family members in the study if they were over 18 years old, and being a primary family member of an adolescent mother such as partner/husband, mother, father, or grandmother/father who was selected by the adolescent mother. The following exclusion criteria were adolescent mothers or infants who had complications after delivery, or adolescent mothers or primary family members who would not be able to participate in all sessions of the NLSS program.

For pilot and feasibility study, a formal sample size calculation may not be appropriate.[33] According to Connelly,[34] it is suggested that a sample size of pilot study should be 10% of the project sample size. Based on the G*power program version 3.1.9.2,[35] an effect size of 0.21 from the previous study[31] and an expected drop-out rate of 20%, the sample size in our next RCT study was 42 including 21 participants in each group. Therefore, a minimum sample size in this pilot study was 5.

Of the 23 adolescent mothers assessed for eligibility, 18 of these mothers were excluded; specifically, thirteen did not meet the inclusion criteria and five declined to participate in the study. A total of 5 adolescent mothers with EPDS scores of less than 13 and 5 primary family members were enrolled in the study (Figure 1).

Intervention and Procedures

Receiving adequate social support from healthcare professionals and family members, in addition to accurate information, may be able to prevent the risk for developing PPD.[28] Therefore, this study developed the NLSS program for preventing PPD in adolescent mothers based on the social support theory,[36] related literature describing the social support needed for adolescent mothers after childbirth[31] and systematic reviews.[30] The NLSS program was designed to cover four dimensions of social support namely informational, emotional, instrumental and appraisal support) and include support from professional nurses and primary family members.

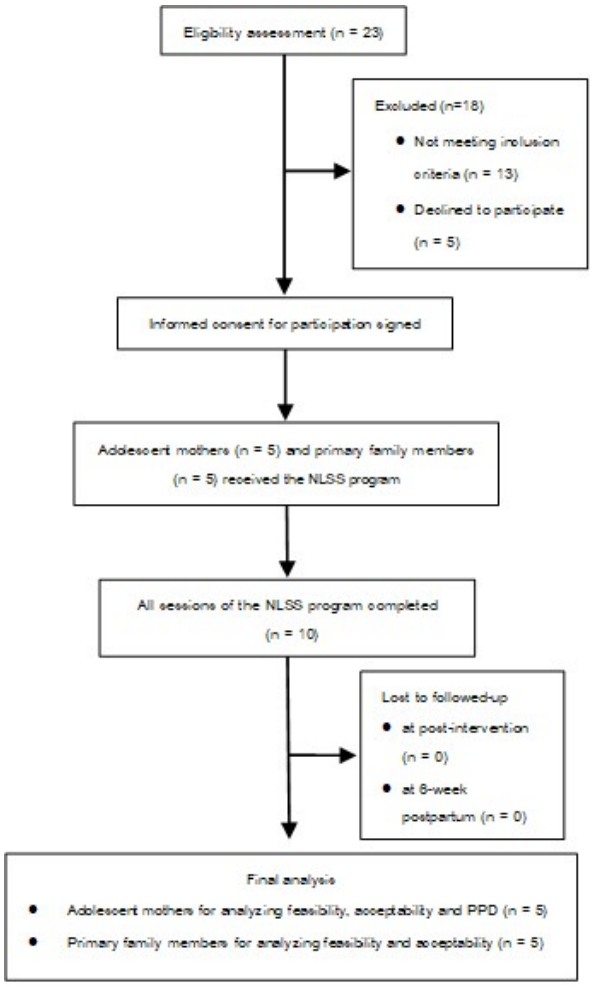

Figure 1 Study procedure.

The NLSS program was organized into two phases and consisted of four sessions with six activities conducted over a period of four weeks. The first phase consisted of providing health information, training adolescent mother to express her need for support after childbirth and training the primary family members of adolescent mother to provide social support. In phase 2, activities included encouraging adolescent mother to express her need for support after childbirth and encouraging the primary family members of the adolescent mother to provide them social support. The purposes of the program were to encourage adolescent mothers to express needs for social support after childbirth and to encourage primary family members to provide social support to the adolescent mother. The program was delivered to both adolescent mothers and primary family members at the postpartum unit and the participants' homes from the first day after delivery to the fourth week after delivery.

Briefly, detail of the four sessions was as follows. The first session focused on providing health information about PPD and social support. The researcher delivered PPD and social support information in order to acknowledge adolescent mother for the need of social support after childbirth, and raise awareness of the primary family members of adolescent mother for providing social support to the mother. Adolescent mothers were also taught to detect early PPD symptoms.

In session 2, with the concept of training to ask for help, the activities included training the adolescent mothers to express their needs for social support, and training the primary family members to provide social support for adolescent mothers. The researcher spent about 60 - 90 minutes to provide information about the methods to ask for help and to train the adolescent mother to ask for social support from their primary family members. The methods included demonstration, role-play, and feedback. These family members were also trained to provide the social support.

Session 3 was based on the concept of encouraging the adolescent mother to ask for help. Adolescent mothers were encouraged to express their needs for social support necessary and consistent with their own needs under their real living condition after discharge. Similarly, their primary family members were encouraged to provide social support necessary and consistent with the needs of the adolescent mother. In the last session, monitoring and consultation guided the activities. The researcher provided monitoring and consultation via home-visit and telephone contacts. The details of the NLSS program are shown in Table 1. We offered participants US$ 20.00 for completing the 6-week postpartum assessment.

Usual nursing care

Usual nursing care was the nursing care that delivered to adolescent mother in the control group and the experimental group during postpartum period by staff nurses. Adolescent mothers received health information about maternal health throughout the early postpartum period. The information provided by staff nurses at postpartum unit included nutrition, medication, breastfeeding, preparation for home infant care, maternal-infant complications, family planning, breastfeeding-skill training, and infant care-skill training (e.g. bathing, shampooing, cord care, and eyes care). After discharge from the hospital, adolescent mothers received postpartum care by staff at the health promoting hospital. During postpartum period until 4 - 6 weeks after delivery, the staff at the health promoting hospital provided cares including telephone contact within 7 days after delivery and home visit at least 2 times.

Table 1 Details of the NLSS Program.

Session	Session Activities	Time-Period	Setting
Session 1 ● Providing health information about PPD and social support.	**(Activity 1)** The researchers provided informational support for the adolescent mothers and the primary family members of the adolescent mothers about PPD and social support in order to help the adolescent mothers recognize their need for social support after childbirth and to raise awareness about providing social support for the adolescent mother among the primary family members. The researchers also provided instruction about the signs and symptoms of PPD for the detection of early symptoms of postpartum depression in the adolescent mothers (60 - 90 minutes).	1st day of hospitalization within 12-24 hours after delivery.	Postpartum care unit
Session 2 ● Training adolescent mothers to express their need for social support after childbirth. ● Training primary family members in providing social support consistent with the needs of the adolescent mothers.	**(Activity 2)** The researchers provided informational support to the adolescent mothers and primary family members with focus on the methods of asking for help from the primary family members. At this time, the researchers trained the adolescent mothers how to express their need for the four dimensions of social support after childbirth from the primary family members through many methods, including demonstration, role-play and feedback (30 - 45 minutes). In addition to the adolescent mothers, the researchers also trained the primary family members in providing the social support needed by the adolescent mothers after delivery via many methods, including demonstration, role-play, and feedback (30 - 45 minutes). The four dimensions of social support were described as follows: - *Informational support:* The primary family members of adolescent mother were encouraged to provide the informational support to adolescent mother by advising about postpartum care (e.g. normal postpartum bleeding, care of episiotomy wound, use of pads, nutrition) and infant care (e.g. breastfeeding, holding, how to take care of the cord and eyes, bathing, clothing and diapers changing). - *Emotional support:* The primary family members were encouraged to provide the emotional support to adolescent mother by asking to share feeling about delivery and infant. The primary family members also provided a good listening, and expression of love, understand and concern together with sharing previous owns' experience to adolescent mother. - *Instrumental support:* The primary family members of adolescent mother were encouraged to involve in providing the material and economic supports to adolescent mother by providing the practical assistance. The practical assistance from the primary family members consisted of help with meals, laundry, money, housekeeping, having time to take a follow-up at hospital. The primary family members were also encouraged to involve in alleviation of the infant care responsibility of adolescent mother by holding an infant, taking an infant to sleep, caring of cord and eyes, bathing, clothing and diapers changing, etc. - *Appraisal support:* The primary family members provided the appraisal support to adolescent mother by giving information for positive feedback, giving confidence to adolescent mothers for practicing postpartum care and infant care.	2nd day of hospitalization within 24-48 hours after delivery.	Postpartum care unit
Session 3 ● Encouraging adolescent mothers to express their need for social support. ● Encouraging primary family members to provide social support for adolescent mothers.	**(Activity 3)** After discharge from hospital, the adolescent mothers were encouraged to express their needs for social support after childbirth as necessary and consistent the mothers' individual needs under real-living conditions at their homes, and the primary family member were encouraged to provide social support as necessary and consistent with the needs of the adolescent mothers.	4th day to 4th week after delivery.	Participants' homes
Session 4 ● Monitoring and consultation via home-visiting and telephone contacts.	**(Activity 4)** During one-time home visits for 90–120 minutes, the researchers had many roles aimed at preventing PPD in adolescent mothers as follows: - *Provider role:* Provision of informational support about postpartum care and infant care under real-living conditions at the participants' homes. - *Monitor role:* Assessment of adolescent mothers for social support needs after childbirth, ability to ask for help from the primary family members, and activities of the primary family member in providing social support to adolescent mothers under real-living conditions in the participants' homes. - *Facilitator role:* Raising awareness of the importance of the primary family members' roles in providing social support for the adolescent mothers. In cases where the primary family members could not provide social support, the researcher provided a consultation with appropriate resources for informational support. **(Activities 5 and 6)** During telephone contacts for 15 – 20 minutes, the researchers communicated with the adolescent mothers and the primary family members following a telephone script form on the following: - Asking the adolescent mothers regarding the support required after childbirth. - Monitoring to ensure that the primary family members were able to provide social support for the adolescent mothers. - Providing consultation and facilitation for the primary family members to continuously provide social support for the adolescent mothers.	Home visiting at the 7th day after delivery Telephone contacts at the 14th and 21st days after delivery.	Participants' homes Participants' homes.

Measures

Feasibility and Acceptability

The participants' attendance and drop-out rates were considered as well as the outcomes related to the feasibility of the NLSS program. In addition, we also examined and categorized the reasons for terminating participation in the program. Acceptability of the NLSS program referred to determining how well an intervention was perceived by the target population and the extent to which the new intervention or its components met the needs of the target population and organizational setting.[37] Sekhon et al[38] conducted an overview of systematic reviews to develop a multi-construct theoretical framework of acceptability of healthcare interventions. From the 43 reviews included in the overview, they concluded that the theoretical framework of acceptability comprising seven component constructs: affective attitude, burden, ethicality, intervention coherence, opportunity costs, perceived effectiveness and self-efficacy.[38] Based on the theoretical framework of acceptability, therefore, the acceptability in this study was assessed by satisfaction which was an affective attitude (i.e., how an individual feels about the intervention), helpfulness and usefulness which was perceived effectiveness (i.e., the intervention was perceived as likely to achieve its purpose). The adolescent mothers and primary family members were asked to complete the evaluation form at the end of the intervention. The evaluation form consisted of three statements reflecting perceptions about the program and assessed the respondents' level of agreement or disagreement with each statement using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher

scores reflected a high level of helpfulness, satisfaction and usefulness from the NLSS program. In addition, we asked the participants the following open-ended questions to guide future modifications of the NLSS program, specifically, “What did you like most about the NLSS program?” and “What did you like least about the NLSS program?”

Postpartum Depression

The Edinburgh Postnatal Depression Scale (EPDS) was specifically developed by Cox et al[32] to screen the postpartum depressive symptoms. This tool contains 10-item self-report which was a commonly used screening instrument for the symptoms of perinatal and postpartum depression. The tool was a self-report questionnaire which can be completed in approximately 5 minutes. For each of the 10 items of EPDS, it is rated on a 4-point Likert scale ranging from 0 to 3, with a possible total score of 0 to 30 points, with higher scores indicating greater severity of depressive symptoms. The items included statements relating to feelings of mothers experienced during the previous seven days and evaluated depressed mood, anhedonia, guilt, anxiety and suicidal ideation. Scores of or higher than the recommended cut-off score of 13 were considered having depressive symptoms.[32] In this study, the EPDS was used to measure PPD at pre-intervention (within 1 day after delivery), post-intervention (4-weeks postpartum) and follow-up (6-weeks postpartum).

This tool was translated and validated in Thai version by Vacharaporn et al.[39] The EPDS Thai version was one of the most frequently used tools to screen postpartum depression in Thai adolescent mothers. Several previous studies about postpartum depression in Thai adolescent mothers found the Cronbach’s alpha coefficients of the EPDS Thai version were 0.81 and 0.87.[40,41] Generally, the reliability of the instrument was evaluated by using internal consistency with a Cronbach’s alpha of 0.80 or above indicating an acceptable reliability.[42] With an acceptable reliability of the EPDS previously proved, the EPDS Thai version was tested for reliability in this present study. Regarding ethical concern, any adolescent mothers with an EPDS score of 13 or greater at four or six weeks postpartum would be referred to consultation with psychiatric nurses or psychiatrists at the hospital.

Statistical analyses

Descriptive statistics were used to describe personal data and analyze the feasibility and acceptability of the study. Repeated measured ANOVA was used to analyze the differences of the EPDS scores over three time points at baseline, post-intervention at 4-week postpartum and follow-up at 6-week postpartum. Pairwise comparisons were adjusted by using Greenhouse-Geisser correction. Statistical significance was set at a type I error of 5%. Statistical Package for Social Science (SPSS) version 24.0 was used to analyze all data.

Results

The five adolescent mothers who participated in the program aged range from 15 to 19 years (M = 17.0, SD = 1.58). The majority of the adolescent mothers were partnered (60%), had unplanned pregnancies (100%), and were living with their parents and other family members (60%).

The majority of the primary family members who provided social support for the adolescent mothers were mothers (80%), followed by partners or fathers of the baby (20%). These family members were 25 to 43 years old (M = 37.80, SD = 7.33) and were married (80%).

Table 2 Demographic characteristics of the study sample.

Characteristics	*N* (%)
Adolescent mothers (n = 5)	
Age (years) (Mean ± SD)	17.00 ± 1.58
Number of family members (person)	5.80
Education level	
Primary school	1 (20.0%)
Junior high school	1 (20.0%)
Senior high school	3 (60.0%)
Marital status	
Single	2 (40.0%)
Partnered	3 (60.0%)
Planned pregnancy	5 (100.0%)
Living with	
Parents and family members	3 (60.0%)
Parents, family members and partner	1 (20.0%)
Partner and partner’s family	1 (20.0%)
Primary family member (n = 5)	
Age (years) (Mean ± SD)	37.80 ± 7.33
Relationship with adolescent mother	
Mother	4 (80.0%)
Partner / Father of baby	1 (20.0%)
Education level	
Primary school	1 (20.0%)
Junior high school	1 (20.0%)
Senior high school	2 (40.0%)
High vocational certificate	1 (20.0%)
Marital status	
Married	4 (80.0%)
Widowed/ Divorced/ Separated	1 (20.0%)

Feasibility of the NLSS program

At the end of the study, a total of five adolescent mothers and five primary family members of adolescent mothers in the experimental group completed all four sessions and all six activities of the NLSS program. None of the participants were

lost to follow-up during the 4-week study. Therefore, the attendance rate was 100.00% and the dropout rate was 0.00% at the end of the study (Figure 1).

Acceptability of the NLSS Program

Adolescent mothers

The total mean score on the evaluation form was 4.47 out of 5 points (range: 3 - 5). When the items were considered individually, the acceptability aspect with the highest mean score was helpfulness of the program (4.60 ± 0.55), followed by the usefulness of (4.40 ± 0.55) and the satisfaction toward (4.40 ± 0.89) the program. Therefore, the high total and individual scores indicated high levels of helpfulness, usefulness and satisfaction with the NLSS program the participants had received.

Based on the open-ended questions about the components of the NLSS program, most adolescent mothers (n = 4 or 80%) indicated that they appreciated the health information about PPD, the training skills in expressing their need for social support, the home visit and the telephone contacts from the researcher (Table 3). However, more than half of the adolescent mothers (n = 3 or 60%) reported that they were not satisfied with the booklet receiving from the researcher. They would have preferred the booklet in electronic form that could be downloaded via smartphone.

Table 3 Questions and narrative comments related to acceptability of the intervention among the adolescent mothers. .

Question	Mean Score	Narrative Comments
Do you think the NLSS program would be helpful in preventing PPD in adolescent mothers?	4.60	
Would you recommend the NLSS program to friends or other adolescent mothers?	4.40	
Were you satisfied with the NLSS program you received?	4.40	
What did you like most about the NLSS program?		I felt comfortable when the nurses came to my home. They helped me identify my true needs at home. And they came to assess my problems and needs. They also helped my mom learn how to offer the help consistent with my needs. They taught me about postpartum depression. Currently, there are a lot of women suffering from postpartum depression. The nurses' instruction helped me cope and prevented me from experiencing postpartum depression. At first, I hoped I would be able to raise my child by myself, so I did not know about situations where I should call my mom for help. After I had participated in the NLSS program, I learned what my needs were. The program also helped my mom learn how to offer her help.
What did you like least about the NLSS program?		I would like to have a mobile version of the booklet. The cartoon and animation of the booklet should be very interesting.

Primary Family Members of Adolescent Mothers

The total mean score on the evaluation form of the primary family members was 4.47 out of 5 points (range: 3 - 5). All three individual aspects of acceptability on the NLSS program, helpfulness, usefulness and satisfaction, were also highly rated (4.40 ± 0.89, 4.40 ± 0.84, and 4.80 ± 0.45 points, respectively).

When the narrative comments in the open-ended questions about the components of the NLSS program were considered individually, most primary family members (n = 4 or 80%) indicated that they appreciated the health information about PPD, the training of primary family members in providing social support for the adolescent mothers, the booklet, and the contacts from the researcher via home visits and the telephone follow-ups (Table 4).

Table 4 Questions and narrative comments related to acceptability of the intervention among the primary family members.

Question	Mean Score	Narrative Comments
Do you think the NLSS program would be helpful in preventing PPD in adolescent mothers?	4.40	
Would you recommend the NLSS program to friends or other adolescent mothers?	4.40	
Were you satisfied with the NLSS program you received?	4.80	
What did you like most about the NLSS program?		The program helped me learn how to provide help and care for my daughter. After I participated in the program, I had more understanding about postpartum depression. It is a serious problem in adolescent mothers.
What did you like least about the NLSS program?		Hard copy booklets might be inconvenient.

Postpartum Depression in the Study

After participating in the NLSS program, mean EPDS scores at baseline, post-intervention at 4-week postpartum and follow-up at 6-week postpartum were statistically different (*P*–value < 0.001) (Figure 2). Therefore, NLSS program could make mean scores of at least two time points to be significantly different. Post hoc comparisons revealed significant differences between pretest and post-intervention, pretest and follow-up at 6-week postpartum, and post-intervention to follow-up at 6-week postpartum (*P*–value = 0.007, 0.003 and 0.033, respectively). Based on the cut-off of 13 or EPDS, none of the adolescent mothers had PPD at four and six weeks postpartum.

Discussions and Conclusion

The pilot NLSS program was developed for the adolescent mothers who were receiving postpartum care at a large tertiary

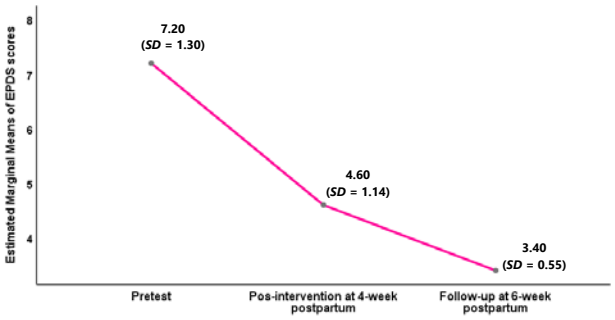

Figure 2 The difference of EPDS scores across three time points. Note: Differences between pretest and post-intervention, pretest and follow-up at 6-week postpartum, and post-intervention to follow-up at 6-week postpartum (*P*–value = 0.007, 0.003 and 0.033, respectively).

hospital and receiving social support from family members. In this pilot study, the researchers found the NLSS program to be promising as a feasible, acceptable and effective intervention for preventing PPD in adolescent mothers. All of the participants who participated in the NLSS program completed all sessions of the program, and attendance rates were very high. The high attendance rate for the program was similar to other interventions for preventing PPD in adolescent mothers[31,43] and better than a previously published pilot study.[44]

The NLSS program was highly acceptable to the adolescent mothers and family members. All of the participants reported that the program was more helpful and useful in preventing the development of PPD. Furthermore, the participants were satisfied with the program they had received. However, 60% of the adolescent mothers reported that they were not satisfied with the booklet received from the researcher, stating that they would have preferred the booklet to be in electronic form that could be downloaded by scanning the QR code via smartphone. Therefore, a booklet in electronic form via QR code is required for modification for future studies to attract the interest of the adolescent mothers and prompt them to read it.

The preliminary effectiveness of the NLSS program was demonstrated by the significant decrease in EPDS scores from baseline. The EPDS scores decreased over time points from baseline to post-intervention at 4-week postpartum and follow-up at 6-week postpartum. This could indicate that the NLSS program, comprising of health educational support and home-visit, was effective to prevent PPD in adolescent mothers. The findings are consistent with several previous studies that used health educational support and home-visiting as interventions for preventing PPD in adolescent mothers. Ickovics et al[45] found "high stress" in adolescent mothers who received a prenatal care educational intervention (Centering Pregnancy Plus; CP+) had significantly decreased PPD at one year postpartum. In other studies, Barlow et al[46] found adolescent mothers who participated in the Family Spirit Home-visiting intervention to have lower depressive symptoms compared with a control group at 36 months postpartum. Another study of Ginsburg et al evaluated the feasibility of a depression prevention program for American Indians adolescents and young adults.[44] They developed the “Living in Harmony” (LIH) intervention which was modified from CBT curricula and “Educational–Support program” (ES). Both interventions were delivered to American Indian adolescents by American Indians paraprofessionals. However, the study had no control group. The goal of the intervention was to decrease prenatal depressive symptoms and prevent the onset of major depressive disorder (MDD) in adolescent mothers after childbirth. Adolescents were evaluated for their depressive symptoms during their pregnancy at baseline, at post-intervention, and at 4, 12, and 24 weeks postpartum. At the end of the study, the results showed that the rates of depressive symptoms and MDD were similarly reduced in both groups compared with the scores at baseline. Therefore, the results indicated that the rate of PPD and depressive scores in both groups decreased over time points from baseline to post-intervention and follow-up at 4, 12 and 24 week postpartum.[44] However, the findings of our pilot study are inconsistent with Logsdon et al[31] who found pregnant adolescents in a social support intervention group reported non-significant differences in PPD at six weeks postpartum.

During postpartum period, women have a high demand for health information and social support from family members and health care providers.[47] In the NLSS program, therefore, the informational support about PPD and four dimensions of social support from health professionals could enhance the understanding of PPD and the importance of asking for social support from family members. Similar studies found that providing the information about PPD and social support to mothers and family members at postpartum period, especially during hospitalization immediately after delivery, was and effective method to decrease the risk to develop PPD.[27,28,48]

A recent systematic review of interventions for preventing PPD in adolescent mothers by Sangsawang et al[30] found that

all of the psychosocial interventions were delivered only during the antenatal period and were not extended to the postpartum period. Moreover, health professionals including midwives, nurses, obstetricians and para-professionals were found to be significant persons in directly providing social support interventions for pregnant adolescents.[30] The recent feasibility study for the current research supports these findings. Therefore, unlike the majority of interventions to prevent PPD, this pilot NLSS program was developed and focused on providing social support not only by health care professionals, but also from family members to adolescent mothers. The social support from family members and the husband are the most important sources for the first-time mothers to provide support.[23] Moreover, the mother of an adolescent mother is the most common supporter for providing support and assistance to adolescent mothers during pregnancy and the postpartum period when they face a distress.[49] Many adolescent mothers still lived with their mother after delivery, and they were likely to be dependent on their mother for financial support and newborn care, as well as for emotional support.[18,50] In addition to the support from mother of the adolescent mother, emotional, esteem, and instrumental, informational, and connection support after childbirth provided by formal support from trusted healthcare providers are also needed.[51] Most mothers in the early period after childbirth felt a need for social support during their transition to the maternal role from healthcare professionals such as midwives and nurses.[25]

Although the NLSS program in the pilot study was found to have significant effectiveness in reducing EPDS scores in adolescent mothers, the results of this pilot study should be interpreted within the context of several limitations. First, the sample size was very small, which limits the generalizability of the results. However, the participants' characteristics in the NLSS pilot study were similar to those reported in previous larger studies which were conducted in the same population.[31,43-45] The majority of the participants were 13 - 19 years old, completed high school, lived and received assistance or support from family members, particularly parents and fathers of their babies. Secondly, the absence of a control group in this study might have interfered with the interpretation of the effectiveness of the program. Therefore, a randomized controlled trial design and enrollment of more participants are required for future studies to examine the effectiveness of the program. Lastly, most of the adolescent mothers in the pilot study lived in urban rather than rural areas. The adolescent mothers who lived in urban areas had adequate access to resources for support during the postpartum period such as support from health centers. These circumstances might have promoted social support for the participants. Therefore, the results may not be generalized to other adolescent mothers living in rural areas.

In conclusion, The NLSS program is one of very few interventions delivered to both adolescent mothers and family members to prevent PPD. All of the participants in the program were highly satisfied and gave positive feedback on the usefulness of the program in assisting them to understand the importance of social support for preventing PPD. The findings of the pilot study indicate that the NLSS program is feasible, acceptable and effective for preventing the development of PPD in adolescent mothers.

Acknowledgements

We would like to thank the adolescent mothers and family members who participated in our study. Special gratitude and appreciation to the Graduate School, Burapha University for supporting grant in conducting this study. Also, special thanks to Miss Nucharee Sangsawang, PhD. Candidate for assisting data collection and Dr. Denchai Laiwattana, M.D. for helpful advice on the search strategy, and valuable critique of the manuscript.

References

1. Mollborn S, Morningstar E. Investigating the relationship between teenage childbearing and psychological distress using longitudinal evidence. *J Health Soc Behav* 2009;50(3):310-326.
2. Angley M, Divney A, Magriples U et al. Social support, family functioning and parenting competence in adolescent parents. *Matern Child Health J* 2015;19(1):67–73.
3. Devito J. How adolescent mothers feel about becoming a parent. *J Perinat Educ* 2010;19(2):25–34.
4. Pinzon JL, Jones VF. Care of adolescent parents and their children. *Pediatrics* 2012;130(6):1743–1756.
5. Jones I, Cantwell R, on behalf of the Nosology WorkingGroup, Royal College of Psychiatrists, Perinatal Section. The classification of perinatal mood disorders—Suggestions for DSM-V and ICD-11. *Arch Womens Ment Health* 2010;13(1):33–36.
6. Zlotnick C, Tzilos G, Miller I et al. Randomized controlled trial to prevent postpartum depression in mothers on public assistance. *J Affect Disord* 2016;189:263-268.
7. Patel M, Bailey RK, Jabeen S et al. Postpartum depression: a review. *J Health Care Poor Underserved* 2012;23(2):534-542.

8. Meltzer-Brody S, Bledsoe-Mansori SE, Johnson N et al. A prospective study of perinatal depression and trauma history in pregnant minority adolescents. *Am J Obstet Gynecol* 2013;208(3):211, e211–217.
9. Venkatesh KK, Phipps MG, Triche EW, et al. The relationship between parental stress and postpartum depression among adolescent mothers enrolled in a randomized controlled prevention trial. *Matern Child Health J* 2014;18(6):1532-1539.
10. Ierardi E, Ferro V, Trovato A, et al. Maternal and paternal depression and anxiety: their relationship with mother-infant interactions at 3 months. *Arch Womens Ment Health* 2019;22(4):527-533.
11. Hodgkinson S, Beers L, Southammakosane C, et al. Addressingthe mental health needs of pregnant and parenting adolescents. *Pediatrics* 2014;133(1):114-122.
12. Tronick E, Reck C. Infants of depressed mothers. *Harv Rev Psychiatry* 2009;17(2):147-156.
13. Ross LE, Dennis CL. The prevalence of postpartum depression among women with substance use, an abuse history, or chronic illness: a systematic review. *J Womens Health* 2009;18(4):475–486.
14. Pao C, Guintivano J, Santos H, et al. Postpartum depression and social support in a racially and ethnically diverse population of women. *Arch Womens Ment Health* 2019;22(1):105-114.
15. Xie RH, He G, Koszycki D, et al. Prenatal social support, postnatal social support, and postpartum depression. *Ann Epidemiol* 2009;19(9):637–643.
16. Lanzi RG, Bert SC, Jacobs BK. Depression among a sample of first-time adolescent and adult mothers. *J Child Adolesc Psychiatr Nurs* 2009; 22:194-202.
17. Crase SJ, Hockaday C, Cooper McCarville P. Brief report: Perceptions of positive and negative support: Do they differ for pregnant/parenting adolescents and nonpregnant, nonparenting adolescents? *J Adolesc* 2007;30(3):505–512.
18. Figueirrdo B, Bifulco A, Pacheco A. Teenage pregnancy, attachment style, and depression: a comparative of teenage and adult pregnant women in a Portuguese series. *Attach Hum Dev* 2006;8(2):123–138.
19. Kim THM, Connolly JA, Tamin H. The effect of social support around pregnancy on postpartum depression among Canadian teen mothers and adult mothers in the maternity experiences survey. *BMC Pregnancy Childbirth* 2014;14:162.
20. Nunes AP, Phipps MG. Postpartum depression in adolescent and adult mothers: Comparing prenatal risk factors and predictive models. *Matern Child Health J* 2013;17(6):1071–1079.
21. Brown J, Harris S, Woods E, et al. Longitudinal study of depressive symptoms and social support in adolescent mothers. *Matern Child Health J* 2012;16(4):894–901.
22. Cox JE, Burman M, Valenuela J, et al. Depression, parenting attributes, and social support among adolescent mothers attending a teen tot program. *J Pediatr Adolesc Gynecol* 2008;21(5):275–281.
23. Gao LL, Xie W, Yang X, et al. Effects of an interpersonal-psychotherapy-oriented postnatal programme for Chinese first-time mothers: A randomized controlled trial. *Int J Nurs Stud* 2015;52(1):22–29.
24. Darvill R, Skirton H, Farrand P. Psychological factors that impact on women's experiences of first-time motherhood: a qualitative study of the transition. *Midwifery* 2010;26:357–366.
25. Teeffelen SA, Nieuwenhuijze M, Korstjens I. Women want proactive psychosocial support from midwives during transition to motherhood: a qualitative study. *Midwifery* 2011;27(1):122–127.
26. Dennis CL, Dowswell T. Psychosocial and psychological interventions for preventing postpartum depression. *Cochrane Database Syst Rev* 2013;28(2):CD001134.
27. Hayes BA, Muller R. Prenatal depression: a randomized controlled trial in the emotional health of primiparous women. *Res Theory Nurs Pract* 2004;18(2-3):165–183.
28. Ho SM, Heh SS, Jevitt CM, et al. Effectiveness of a discharge education program in reducing the severity of postpartum depression: a randomized controlled evaluation study. *Patient Educ Couns* 2009;77: 68–71.
29. Dennis CL, Hodnett E. Psychosocial and psychological interventions for treating postpartum depression. *Cochrane Database Syst Rev* 2007;(4): CD006116.
30. Sangsawang B, Wacharasin C, Sangsawang N. Interventions for the prevention of postpartum depression in adolescent mothers: a systematic review. *Arch Womens Ment Health* 2019;22(2):215-228.
31. Logsdon MC, Birkimer JC, Simpson T, et al. Postpartum depression and social support in adolescents. *J Obstet Gynecol Neonatal Nurs* 2005; 34:46–54.
32. Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. *Br J Psychiatry* 1987;150:782–786.
33. Julious SA. Sample size of 12 per group rule of thumb for a pilot study. *Pharm Stat* 2005;4(4):287–291.
34. Connelly LM. Pilot studies. *Medsurg Nurs* 2008;17(6):411-412.
35. Faul F, Erdfelder E, Buchner A, et al. Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behav Res Methods* 2009;41:1149–1160.
36. House J. Work stress and social support. Reading. MA. Addison-Wesley, 1981.
37. Ayala GX, Elder JP. Qualitative methods to ensure acceptability of behavioral and social interventions to the target population. *J Pub Health Dent* 2011;71 Suppl 1:S69-S79.
38. Sekhon M, Cartwright M, Francis JJ. Acceptability of healthcare interventions: an overview of reviews and development of a theoretical framework. *BMC Health Serv Res* 2017;17(1):88.
39. Vacharaporn K, Pitanupong J, Samangsri N. Development of the Edinburgh postnatal depression scale Thai version. *J Ment Health Thai* 2003;11:164–169.
40. Moontito W, Sriarporn P, Baosoung C. Postpartum depression, social support, and functional status among adolescent mothers. *Nurs J* 2017; 44(2):23–33.
41. Phummanee N, Roomruangwong C. Postpartum depression teenage mothers: A study at Department of Medical Services, Sirindhorn Hospital, Bangkok. *Chula Med J* 2015;59(2):195 – 205.
42. Hair JF, Black WC, Babin BJ et al. Multivariate data analysis: A global perspective (7th ed.). Upper Saddle River, NJ. Pearson, 2010.
43. Phipps MG, Raker CA, Ware CF, et al. Randomized controlled trial to prevent postpartum depression in adolescent mothers. *Am J Obstet Gynecol* 2013;208(3):191-196.

44. Ginsburg GS, Barlow A, Goklish N, et al. Postpartum depression prevention for reservation-based American Indians: Results from a pilot randomized controlled trial. *Child Youth Care Forum* 2012;41:229-245.
45. Ickovics JR, Reed E, Magriples U, et al. Effects of group prenatal care on psychosocial risk in pregnancy: results from a randomized controlled trial. *Psychol Health* 2011;26(2):235–250.
46. Barlow A, Mullany B, Neault N, et al. Paraprofessional-delivered home-visiting intervention for American Indian teen mothers and children: 3-year outcomes from a randomized controlled trial. *Am J Psychiatry* 2015; 172(2):154–162.
47. Sword W, Watts S. Learning needs of postpartum women: does socioeconomic status matter? *Birth* 2005;32:86–92.
48. Vaezia A, Soojoodib F, Banihashemic AT, et al. The association between social support and postpartum depression in women: A cross sectional study. *Women Birth* 2019;32(2):238–242.
49. Simpson JA, Rholes WS. Adult attachment orientation, stress, and romantic relationship. *Adv Exp Soc Psychol* 2012;45:279–328.
50. Stiles AS. A pilot study to test the feasibility and effectiveness of an intervention to help teen mother and their mother clarify relational boundaries. *J Pediatr Nurs* 2008;23(6):415–428.
51. Corrigan CP, Kwasky AN, Groh CJ. Social support, postpartum depression, and professional assistance: a survey of mothers in the Midwestern United States. *J Perinat Educ* 2015;24(1):48–60.