

ADOLESCENT PREGNANCY AND CHILDBIRTH OUTCOMES: A HOLISTIC CARE PROGRAM AT THE PRIMARY CARE UNIT OF A NATIONAL TERTIARY REFERRAL CENTER

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Abstract. Adolescent pregnancy is associated with high risk of negative consequences for both mother and infant. We implemented a comprehensive holistic care program (HCP) that aims to improve pregnancy outcomes in adolescents who receive antenatal care (ANC) at a primary care unit (PCU) in Bangkok, Thailand. The HCP was developed by a multi-disciplinary team, with trained nurse practitioners providing care to adolescents during and after pregnancy at the PCU of Siriraj Hospital. A retrospective chart review of pregnant adolescents aged 10-19 years who participated in the HCP was conducted. Of the 70 adolescent who received HCP care, the median age at first ANC visit was 17 (IQR: 16-18) years and 11 (14.5%) adolescents had history of induced abortion. Thirty-eight (54.3%) adolescents did not use any type of birth control and 41 (58.6%) reported a history of substance use, with 9 of those continuing substance use during pregnancy. Six adolescents were depressed and required psychiatric consultation. Median number of ANC visits was 8 (IQR: 6-11), and median maternal weight gain was 8.6 (IQR: 6.2-12.1) kilograms. Sixty-three (82.9%) babies were full-term births, with median gestational age of 39 (IQR: 38-39) weeks. Of those, 7 (11.1%) had birth weight less than 2,500 grams. Pregnant adolescents evaluated in this study demonstrated high-risk sexual and behavioral tendencies. However, after receiving parenting education, a majority of adolescents expressed confidence in their ability to nurture their babies and assume the responsibilities associated with the motherhood role. This finding may suggest improved child-rearing skills and lower incidence of child maltreatment.

Keywords: adolescents, pregnancy, preterm labor, motherhood role, biopsychosocial intervention

INTRODUCTION

The Thai National Health Security Office pregnancy database revealed that the highest birth rate is among adolescents 19 years of age (58.3 per 1,000 population), and the highest preterm

delivery rate (10%) was among adolescents 10-14 years of age (Butchon *et al*, 2014). The majority of adolescent pregnancies are unplanned, resulting in high risk of adverse consequences for both mothers and infants (Areemit *et al*, 2012; Trairisilp *et al*, 2015). Compared with adult pregnancy, adolescent pregnancy was found to be associated with higher risk of poor neonatal outcomes, particularly in those with maternal 15 years (Ganchimeg *et al*, 2014; Kawakita *et al*, 2016). Previous studies have shown that antenatal intervention programs designed to prevent pregnancy complications effectively

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reduced infant mortality and morbidity, such as low birthweight and prematurity, and helped to improve outcomes of adolescent mothers, particularly maternal depression (Lieberman *et al*, 2014; Sukhato *et al*, 2015; Hadley *et al*, 2016).

Although the Universal Health Care Coverage (UHCC) scheme effectively provides healthcare for all Thai people, a busy primary care unit (PCU) would be challenged and perhaps unable to provide comprehensive preventive intervention to this at-risk population. In response to the high rate of adolescent pregnancy, the PCU at Siriraj Hospital implemented a sustainable comprehensive program for pregnant adolescents that aim to improve the quality of care during pregnancy and pregnancy outcomes in at-risk adolescent mothers and children in our center's catchment community. This holistic care program (HCP) was designed to be compatible with local lifestyle and culture.

The objective of this study was to evaluate the outcomes of adolescent pregnancy following the implementation of the HCP at Siriraj Hospital.

MATERIALS AND METHODS

Study design and study subjects

This retrospective chart review was conducted in 70 pregnant adolescents aged 10 to 19 years who participated in the holistic care program (HCP) during the January 2012 to December 2012 study period. The HCP is an intervention-based program for adolescents that are receiving ANC at our center's primary care unit (PCU). The HCP, which was launched in January 2012, was designed and developed by a multidisciplinary team that consisted of an obstetrician, adolescent medicine specialists, a child and adolescent psychiatrist, and a developmental-behavioral pediatrician. The HCP protocol was integrated into routine work and process and was provided to all pregnant adolescents who received ANC at our center's PCU. This study was conducted at Siriraj Hospital – Thailand's largest national

tertiary referral center. The protocol for this study was approved by the Siriraj Institutional Review Board (SIRB), Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand. (COA No. SI263/2015, May 18, 2015).

The inclusion criteria were all pregnant adolescents who attended antenatal care at PCU more than once during the study period. Patients who either lose to follow-up or delivered a baby at another hospital were excluded.

At the first ANC visit, patients were asked to complete three 30-minute, self-evaluated questionnaires to assess risks, to assess needs, and to guide a counseling plan. The questionnaires included:

1) **Thai youth risk-taking behavior questionnaire:** A 111-item self-evaluated survey that was validated by a team of experts and for which a pilot study was conducted to assess content appropriateness and accuracy among Thai school students (Ruangkanchanasetr *et al*, 2005).

2) **Thai Center for Epidemiologic Studies-Depression Scale (Thai CES-D):** A 20-item self-reporting questionnaire to screen for depression. A score of 22 or higher indicated a positive screening for depression. Thai CES-D was found to have sensitivity of 72%, specificity of 85%, accuracy of 82%, and good reliability with a Cronbach's alpha of 0.86 (Trangkasombat *et al*, 1997).

3) **Self-esteem scale:** A modified version of the Thai Rosenberg Self-Esteem Scale that has good internal consistency, with a Cronbach's alpha of 0.84 (Wongpakaran and Wongpakaran, 2012). This 10-item instrument has a 4-point scale that ranges from 1 (strongly disagree) to 4 (strongly agree), and the total score ranges from 10 to 40.

At each ANC visit, pregnant adolescents were interviewed by nurse practitioners (NPs) to assess their biopsychosocial issues and each was given counseling specific to her needs. Each

adolescent received counseling at each ANC visit and the instructive individual counseling session lasted approximately 15 minutes. The study subjects were also provided maternal and child health education via interactive lecture and they practiced their childcare skills using manikins in small group sessions. The sessions included nutrition in pregnancy, birth control methods after delivery, and benefits of breastfeeding. All standardized education tools were made available for the NPs.

During the third trimester, adolescents were evaluated for parenting readiness using the questionnaire of self-evaluated perception of motherhood role that was developed by the HCP multidisciplinary team, each member of which has extensive experience in caring for adolescent mothers. Questionnaire content was considered to be valid when all team members agreed with all items of the questionnaire. This questionnaire consists of 15 items, with a Likert scale from 1 to 5. A score of 1 indicates strong disagreement, a 5 indicates strong agreement, and the highest achievable score is 150.

After delivery, adolescent mothers were scheduled for postpartum check-up. NPs provided home visit care for the individuals who were classified as high-risk adolescent mothers for further family assessment and continuity of care.

Before HCP implementation, NPs at the PCU were intensively trained in seven sessions of interactive lectures and hands-on skills to standardize the knowledge and skills needed to provide care for pregnant adolescents and their families. Training topics included both medical and psychological issues in adolescent pregnancy and parenthood. In addition to nursing care provided, NPs were trained to assess risk-taking behaviors, screen for depressed mood or mental health problems, and to facilitate preparedness of motherhood – particularly breastfeeding and positive parenting.

Statistical analysis

The main pregnancy outcomes were weight gain, number of ANC visits, and route of delivery. The main perinatal outcomes were motherhood role, gestational age, birthweight, and 5-minute Apgar score. Data are reported as number and percentage (%), median and interquartile range (IQR), or mean \pm standard deviation (SD). Statistical analyses were performed using SPSS statistical software, version 18 (IBM, Armonk, NY).

RESULTS

There were 70 adolescents who participated in the HCP protocol at our PCU during the study period. The median age at first ANC visit was 17 (IQR 16-18) years. Seventy adolescents (92%) completed the Thai youth risk-taking behavior questionnaire (Table 1). Of those, 41.8% stayed with their parents and 74.3% had family incomes <10,000 Baht (approximately 285 US dollars) per month. One third of their parents (35.4%) use alcohol and smoke tobacco. The lowest age at first sexual debut in this population was 12 years. The median number of sexual partners was 1 (IQR: 1-1). Eighty-two point nine percent learned sex education as a part of school curriculum. However, less than half (38.6%) of adolescents reported having protected sexual intercourse and 11 (14.5%) had history of induced abortion, two of which were performed by unqualified practitioners in unsafe, non-clinical settings. Twenty (28.6%) girls reported using substance(s) while having sex.

The self-esteem scale revealed 15% feeling a sense of worthlessness and being of no value within their families. Two-thirds felt that their parent(s) have high academic and employment expectations of them. The median total score for this metric was 23 (IQR: 21-25).

The Thai CES-D assessment revealed that eighteen adolescents had positive screening for depression with a median score of 19 (IQR: 15-23.5), but only six reported self-harm or felt

Table 1
Results of the risk-taking behaviors questionnaire.

Variable	Number (%) (N=70)	Median (IQR)
Age at first antenatal visit (years)		17 (16-18)
Family income		
<10,000 baht/month	52 (74.3)	
10,001-30,000 baht/month	17 (24.3)	
>30,000 baht/month	1 (1.4)	
Education		
High school grade 7-9	40 (57.1)	
High school grade 10-12	12 (17.1)	
Drop out from school/unemployment	18 (25.7)	
Age at first sexual intercourse (years)		15 (14-16)
Having knowledge about STD prevention	30 (42.9)	
History of partner using condom for STD prevention	27 (38.6)	
Previous pregnancy	4 (5.7)	
History of induced abortion	11 (14.5)	
Contraceptive method used regularly before pregnancy		
Oral contraceptive pills	12 (17.1)	
Injectable contraceptives	1 (1.4)	
Condom	6 (8.6)	
Withdrawal method	13 (18.6)	
No contraception	38 (54.3)	
Parental substance use		
Smoking	15 (21.4)	
Alcohol consumption	7 (10)	
Smoking and alcohol consumption	39 (55.7)	
No reply to question	9 (12.9)	
Substance use	4 (6.2)	
Illicit drugs (amphetamine, ice, etc)	6 (9.4)	
Alcohol consumption	3 (4.7)	
Smoking	24 (37.5)	
All of the above		
Age at first use of substances (years)		14 (13-16)
History of substance use while having sex	20 (28.6)	
History of substance use	41 (58.6)	
Substance use during pregnancy	9 (12.9)	
History of illicit drug use	7 (10)	

Table 1 (Continued)

Variable	Number (%) (N=70)	Median (IQR)
Reason for using illicit drugs		
Peer pressure	2 (28.6)	
Experimentation	2 (28.6)	
Recreational use	3 (42.9)	
Age at smoking initiation (years)		14 (13-15)
Number of cigarettes smoked per day before pregnancy, mean±SD	5.6 ± 3.3	
History of smoking	18 (25.7)	
Reason for smoking		
Peer pressure	12 (66.7)	
Experimentation	2 (11.1)	
No reply to question	4 (22.2)	
History of alcohol consumption	26 (37.1)	
Reason for drinking alcohol		
Party with friends	19 (73.1)	
Relief/gratification	1 (3.8)	
No reply to question	6 (23.1)	
Feel depressed or a sense of hopelessness in the past 2 weeks	6 (8.6)	
History of suicidal thoughts	4 (66.7)	
Self-esteem score		23 (21-25)
Thai CES-D score		19 (15-23.5)

IQR, interquartile range; STD, sexually transmitted disease; SD, standard deviation; Thai CES-D, Thai Epidemiological Studies Depression Scale.

depressed for two consecutive weeks or longer. Of those, four had suicidal ideation without an action plan. All 19 adolescents were referred for a psychiatric consult. All referred girls reported that they felt better after psychological support and after delivery. No major depressive disorder was diagnosed in any participants.

The motherhood role questionnaire revealed a median total score of 64.5 (IQR: 55-68.25) and a majority of them expressed confidence in their ability to care for their babies. They did, however, report a low level of confidence regarding how to respond to a sick and crying baby (Table 2).

Home visits were provided to 19 (25%) adolescents that were considered to be at high risk such as history of illicit drug use for instance the one with positive urine test for amphetamine prior to delivery.

Seventeen (22.4%) adolescents had weight gain during pregnancy that was within Institute of Medicine (IOM) recommendations. Forty-nine (64.5%) adolescents who did not achieve recommended weight gain delivered normal bodyweight infants.

The vast majority (90.8%) of adolescents had vaginal delivery. Eight (10.5%) preterm

Table 2
Adolescent pregnancy and childbirth outcomes.

Teenage pregnancy outcomes	Number (%)	Median (IQR)
Total weight gain (kilograms)		8.6 (6.2-12.1)
Total weight gain within IOM guidelines	17 (22.4)	
Number of ANC visits		8 (6-11)
Urine positive for amphetamine	1 (1.3)	
Vaginal delivery	69 (90.8)	
Postpartum check-up	59 (77.6)	
Breastfeeding after deliver	71 (93.4)	
Contraception after delivery		
OCP	2 (2.6)	
DMPA	21 (27.6)	
Implant/IUD	13 (2.6)	
Sterilization	1 (1.3)	
Condom	17 (22.4)	
Abstinence	22 (28.9)	
Received home visit	19 (25)	
Motherhood role perception score		64.5 (55-68.25)
Infants born to adolescent mothers	Number (%)	Median (IQR)
Male gender	41 (53.9)	
Gestational age (weeks)		
Term (GA \geq 37)	63 (82.9)	39 (38-39)
Preterm (GA <37)	8 (10.5)	36 (34.3-36)
Body weight of term infants		
<2500 grams	7 (11.1)	
\geq 2500 grams	56 (88.9)	
Body weight (grams)		
Term		2,860 (2,640-3,120)
Preterm		2,380 (2,075-2,667.5)
5-minute Apgar score	1 (1.3)	
<7		
Complete immunization	59 (77.6)	

IQR, interquartile range; IOM, Institute of Medicine; ANC, antenatal care; OCP, oral contraceptive pill; DMPA, depot medroxyprogesterone acetate; IUD, intrauterine device; GA, gestational age.

infants were delivered and one of them required intensive care due to extremely low birth weight (<1,500 grams). All infants survived and were discharged home safely. Only 2 (2.6%) adolescent mothers chose long-acting reversible contraceptive (LARC) method to prevent subsequent pregnancy, and one adolescent decided to undergo tubal sterilization. Postpartum check-up was performed in 77.6% of adolescent mothers in this study.

DISCUSSION

The holistic care program (HCP) established at our primary care unit (PCU) set forth to improve the quality of antenatal care for pregnant adolescents. The findings of this study reveal good outcomes for both mothers and their infants. The majority of adolescents in this study had vaginal delivery, which was similar to previous studies that reported that adolescents were less likely to have cesarean delivery (Damle *et al*, 2015; Kawakita *et al*, 2016). Prevalence of preterm labor in this study (10.5%) was lower than the rate previously reported from Thailand (24.7%) and from the US (25.3%) (Thato *et al*, 2007; Kawakita *et al*, 2016). Moreover, the frequency of NICU admission in this study (1.3%) was also lower than admission rates described in those same two previous studies (5% in Thailand and 21.6% in the US). These results suggest the benefit of HCP for improving self-care among pregnant adolescents. Furthermore, the relationship that might be developed between the adolescent patients and HCP nurse practitioners encouraged patients to comply with scheduled antenatal care visits.

A previously published systematic review and meta-analysis showed that psychosocial intervention reduced low birth weight in adolescent pregnancy, when compared with routine ANC (Sukhato *et al*, 2015). Moreover, biopsychosocial intervention improved patient knowledge, reduced stress, and motivated pregnant adolescents to adopt behaviors that reduced risk

– all of which resulted in improved pregnancy outcomes (Sukhato *et al*, 2015). Pregnant adolescents were more likely to use substances before pregnancy, as compared to non-pregnant adolescents; however, most discontinued use of substances during their pregnancy (Chapman and Wu, 2013). We found that more than half of pregnant adolescents reported substance use before getting pregnant, but about a quarter of that group continued substance use during their pregnancy.

We found a significant decrease in the number of adolescents who used substances after risk-reduction counseling, with only one patient testing positive for amphetamine use at delivery. Risk reduction counseling was reported to be an important component of antenatal care, because it empowered and motivated adolescents to avoid postpartum substance use – particularly in those at risk for depressed mood and stress (Barnet *et al*, 1995). Adolescent mothers are at risk of child maltreatment (Putnam-Hornstein *et al*, 2015), non-nurturing behaviors, and poor parenting role (Thompson *et al*, 1995). Support of the motherhood role is one of the key interventions provided by the HCP and most of the adolescents evaluated in this study expressed confidence in their ability to nurture their babies and their ability to respond to their babies' needs. HCP counseling and training also describes and discusses many of the risks and challenges associated with early parenthood. Increased parenting knowledge reduced maternal stress that is commonly found among adolescent mothers (McPeak *et al*, 2015). As a result of motherhood role counseling provided by the HCP, the adolescent mothers in our study reported a high level of self-assurance regarding their ability to rear their child appropriately.

This study has some limitations. First, there was no control group that did not receive HCP intervention, so we have no data with which we can compare our results. This was a retrospective chart review and there was no simultaneous data

(control) or pre-HCP data that could be used to adequately and equitably compare against our results. As such, we were only able to report performance – not the effectiveness of the program in improving outcomes. While a randomized controlled trial would be the best way to evaluate the effectiveness of this program, ethical arguments could be raised regarding the decision not to provide important interventional care in this vulnerable patient population. Future studies are needed to elucidate the effectiveness of this program and to find ways to improve it.

In conclusion, the HCP at Siriraj Hospital helps to foster pregnant adolescents by endeavoring to improve parenting confidence, ANC visit compliance, and pregnancy outcomes. Pregnant adolescents who participated in this program reported increased pregnancy and medical care-related knowledge and increased psychosocial support. They reported an overall reduction in risk-related behaviors and demonstrated a high level of scheduled ANC visit compliance. Although this study had no comparative cohort, we found lower rates of preterm delivery and low birth weight, when compared with a previous study conducted in Thailand. After receiving HCP counseling, adolescents reported confidence in their ability to assume the responsibilities associated with the motherhood role. This finding suggests improved maternal competence perception in child-rearing skills and lower incidence of child maltreatment.

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CONFLICTS OF INTEREST

The authors hereby declare no personal or professional conflicts of interest regarding any aspect of this study.

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