

ผลของการให้ข้อมูลย้อนกลับผลการตรวจครรภ์ด้วยคลื่นเสียงความถี่สูง อย่างมีส่วนร่วมต่อคะแนนความผูกพันของมารดาและทารกในครรภ์ ในหญิงตั้งครรภ์วัยรุ่นในโรงพยาบาลสรรพสิทธิประสงค์: การศึกษาเชิงทดลองแบบสุ่มมีกลุ่มควบคุม

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บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาผลของการให้ข้อมูลย้อนกลับผลการตรวจครรภ์ด้วยคลื่นเสียงความถี่สูงอย่างมีส่วนร่วมต่อคะแนนความผูกพันของมารดาและทารกในครรภ์ในหญิงตั้งครรภ์วัยรุ่น

ระเบียบวิธีวิจัย: เก็บข้อมูลในสตรีตั้งครรภ์วัยรุ่นที่มาตรวจคลื่นเสียงความถี่สูงที่แผนกฝากครรภ์ โรงพยาบาลสรรพสิทธิประสงค์ อายุครรภ์ 16-28 สัปดาห์ โดยแบ่งกลุ่มในอัตราส่วน 1:1 แบบสุ่มเป็นกลุ่มที่ให้ข้อมูลย้อนกลับแบบมีส่วนร่วมและกลุ่มที่ให้ข้อมูลย้อนกลับแบบปกติ หญิงตั้งครรภ์วัยรุ่นจะได้รับซองคำถามและตอบแบบสอบถามให้ครบถ้วนด้วยตนเอง เพื่อประเมิน ความผูกพันของมารดาและทารกในครรภ์ (Maternal antenatal attachment scale; MAAS), ระดับความวิตกกังวล (Spielberger 1970) และพฤติกรรมการดูแลสุขภาพ โดยประเมินก่อนการตรวจครรภ์ด้วยคลื่นเสียงความถี่ และตอบแบบสอบถามซึ่งมีคำถามเดิมซ้ำอีกครั้งหลังตรวจคลื่นเสียงความถี่สูง 4 สัปดาห์ ตามนัดฝากครรภ์ตามปกติ

ผลการวิจัย: หญิงตั้งครรภ์วัยรุ่น 50 คน ถูกแบ่งเป็นกลุ่มที่ให้ข้อมูลย้อนกลับแบบมีส่วนร่วม 25 คน และกลุ่มที่ให้ข้อมูลย้อนกลับแบบปกติ 25 คน หลังหักหญิงตั้งครรภ์ 2 คนในกลุ่มที่ให้ข้อมูลย้อนกลับแบบมีส่วนร่วมและ 5 คนในกลุ่มปกติ เหลือ 23 คนในกลุ่มที่ให้ข้อมูลย้อนกลับแบบมีส่วนร่วม และกลุ่มที่ให้ข้อมูลย้อนกลับแบบปกติ 20 คน เพื่อนำมาวิเคราะห์ พบว่า การตรวจครรภ์ด้วยคลื่นเสียงความถี่สูงเพิ่มคะแนนความผูกพันของมารดาและทารกในครรภ์ทั้ง 2 กลุ่ม ($P < 0.001$) โดยกลุ่มที่ให้ข้อมูลย้อนกลับแบบมีส่วนร่วม มีคะแนนความผูกพันมากกว่าแบบปกติอย่างมีนัยสำคัญทางสถิติ ($P = 0.001$) รวมทั้งระดับความวิตกกังวลลดลง ($P = 0.043$)

สรุป: การให้ข้อมูลย้อนกลับผลการตรวจครรภ์ด้วยคลื่นเสียงความถี่สูงอย่างมีส่วนร่วมเพิ่มคะแนนความผูกพันของมารดาและทารกในครรภ์รวมถึงลดความวิตกกังวลในหญิงตั้งครรภ์วัยรุ่นอย่างมีนัยสำคัญทางสถิติ

คำสำคัญ: การให้ข้อมูลย้อนกลับแบบมีส่วนร่วม ผลการตรวจคลื่นเสียงความถี่สูง ความผูกพันของมารดาและทารกในครรภ์ หญิงตั้งครรภ์วัยรุ่น

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Introduction

Despite the overall birth rate in Thailand is falling, adolescent pregnancy tends to increase which is now 16 percent of all pregnancy. Three hundred and fifty-five adolescent pregnant women give birth every day. From the Public Health statistics in 2012, of a total 801,737 births, 129,451 was born from teenage mothers. The ratio of adolescents giving birth was 53.8 per 1,000 girls in 2012, which was much higher than the ratio of 31.1 per 1000 in 2000⁽¹⁾.

Maternal-fetal bonding is a relationship between a pregnant woman and her baby⁽²⁾. Strong maternal-fetal bonding has been associated with positive health practices during pregnancy, including obtaining prenatal care, cessation from alcohol, tobacco and illegal drugs, healthy diet, sleep habits, adequate exercise, use of seat belts and learning about pregnancy, childbirth and infant care. Poor maternal-fetal bonding has been associated with increased anxiety, mood disturbance, depression, irritable fetus, postpartum anxiety, postpartum depression, and child abuse^(2,3).

Maternal-Fetal Attachment Scale (MFAS) was developed by Cranley to measure of maternal-fetal bonding. Besides, there are prenatal attachment inventory (PAI) by Muller and Maternal Antenatal Attachment Scale (MAAS) by Codon that focuses exclusively on thoughts and feelings about the fetus. The most commonly used measures are Cranley's MFAS and Codon's MAAS. Furthermore, there is no different effect on maternal-fetal bonding among types of ultrasonographic examining (2-, 3- or 4-dimensional ultrasound)^(2,3).

Adolescent pregnancies often neglect the babies after delivery. This may result from poor maternal-fetal bonding. Data from Nabhan AF and Faris MA⁽⁴⁾ revealed that there is insufficient evidence to support either high or low feedback of obstetric ultrasonographic findings by two-dimensional ultrasound to reduce maternal anxiety and promote health behavior. The data of feedback of obstetric ultrasonographic findings on maternal-fetal bonding in adolescent pregnancy was unavailable. Previous studies were done in general populations⁽⁴⁻¹⁴⁾. There was no study specific for adolescent pregnancy. Furthermore, most studies were reported in developed countries.

The authors would like to study the effect of the interactive feedback of ultrasonographic findings on maternal-fetal bonding in adolescent pregnancy in Sunpasitthiprasong Hospital. Expecting that the interactive ultrasonography will be a factor that increases maternal-fetal bonding and promotes health behavior during pregnancy in adolescent.

Methods

After an approval from institutional ethics committees, adolescent pregnancies were invited to participate during January to June, 2016. All participants provided written informed consent.

Eligible criteria were pregnant women aged younger than 20 years old who underwent routine ultrasonographic examination at 16 to 28 weeks of gestation at antenatal care unit, Sunpasitthiprasong Hospital. The participants who failed to complete the questionnaires or

suffering from life-threatening condition were excluded.

After receiving consent, the participants were randomly assigned by one- to one ratio to interactive feedback group or normal feedback group. Randomization number was created by Microsoft Excel. The demographic data such as age, education, occupation, marital status, obstetric history such as gestational age, planning of pregnancy were collected. The self-reported questionnaires that consisted of Codon's MAAS, Spielberger's Anxiety levels and maternal health behaviors (smoking, and alcohol drinking) were asked. The questionnaires were completed before undergoing ultrasonographic examinations. In the interactive feedback group, the participants viewed the ultrasound monitor and were given a running description of fetal anatomy by the sonographer. On the other hand, the normal feedback group, the participants did not view the ultrasound monitor and were given only summary findings, including the gestational age and well-being of the fetus from the sonographer.

All participants were attended follow-up regular antenatal at 4 weeks later. The same self-reported questionnaires were completed again at 4-weeks after ultrasound examinations. If participants can not follow up, the interview questionnaires were completed by telephone call.

The primary outcome was changing score of MAAS before and after ultrasound examinations. The secondary outcomes were changing anxiety levels and maternal health behavior.

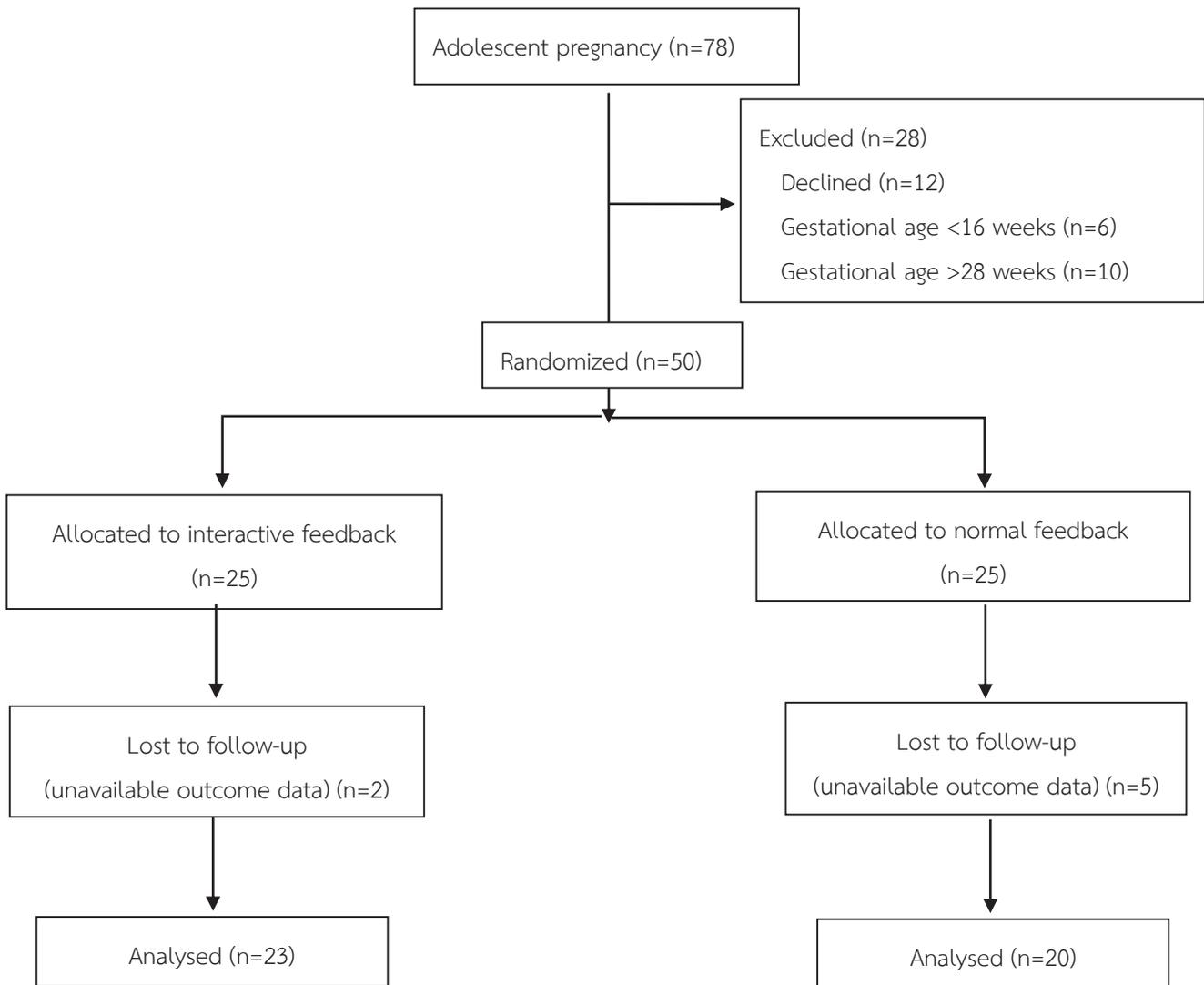
There is no available data regarding feedback of ultrasonographic findings on maternal-fetal bonding in adolescent pregnancy to calculate sample size. All adolescent pregnancy who underwent routine ultrasound examination at 16 to 28 weeks of gestation during January to June, 2016 were enrolled.

Analyses were performed using SPSS version 17.0. The descriptive data were presented as number (%), Mean (S.D.) and Median (IQR). The comparison between groups was performed using Chi-square test or Fisher's exact test, Student t-test and Mann-Whitney U test for categorical, normally, and non-normally distributed continuous variables, respectively. Statistically significant was considered at $P < 0.05$.

Results

There were seventy-eight adolescent pregnancies came for antenatal visits during January to June 2016. After excluding 28 pregnant women, the remaining of 50 adolescent pregnancies consented to participate. They were randomly allocated to either the interactive feedback (N = 25) or normal feedback (N = 25). After ultrasound examinations, 2 participants in the interactive feedback and 5 participants in the normal feedback groups were lost to follow up at 4 weeks later. Eventually, twenty-three participants in the interactive feedback and 20 participants in the normal feedback were analyzed (Figure 1).

Figure 1. Study enrollment and randomization.



The demographic characteristics between the interactive and the normal feedback were not significantly different (Table 1). The average maternal age was 17 years (range, 15-19 years). The average gestational age was 22 weeks (range, 16-28 weeks). The average first antenatal visit was at 16 weeks (range, 6-26 weeks). The highest education was secondary school and university. Most of the participants were unemployed, single and unplanned pregnancy.

Table 1. Demographic characteristics

| Characteristics | Interactive feedback (N=23) | Normal feedback (N=20) | P-value |
|-----------------------------------------|--------------------------------|---------------------------|---------|
| Maternal age (years) † | 17.5±1.2 | 17.2±1.4 | 0.410 |
| Gestational age (weeks) | 21.9±4.2 | 22.3±3.2 | 0.737 |
| Gestational age at first ANC (weeks) | 16.7±7.0 | 15.8±4.4 | 0.834 |
| The highest education | | | 0.771 |
| Primary school | 2(8.7%) | 3(15.0%) | |
| Secondary school | 10(43.5%) | 9(45.0%) | |
| University | 11(47.8%) | 8(40.0%) | |
| Occupation | | | 0.755 |
| Unemployed | 12(52.2%) | 13(65.0%) | |
| Employee | 1(4.3%) | 1(5.0%) | |
| Housewife | 4(17.4%) | 1(5.0%) | |
| Student | 3(13.0%) | 3(15.0%) | |
| Merchant | 2(8.7%) | 2(10.0%) | |
| Farmer | 1(4.3%) | - | |
| Pregnancy expectation | | | 0.999 |
| Planned | 5(21.7%) | 5(25.0%) | |
| Unplanned | 18(78.3%) | 15(75.0%) | |
| Marital status | | | 0.473 |
| Married | 4(17.4%) | 6(30.0%) | |
| Divorced/separated | 1(4.3%) | - | |
| Single | 18(78.3%) | 14(70.0%) | |

Note: Data in the table are given as or number (percentage) and median ± standard deviation (SD) for categorical and continuous variables, respectively.

Post-examination, the total score of MAAS was significantly increased in both interactive and normal feedback group ($P < 0.001$; Table 2). The interactive feedback group was increased from 72.21 to 80.69, whereas, the normal feedback group was increased from 69.85 to 75.00.

Table 2 Maternal Antenatal Attachment Scale (MAAS) pre and post ultrasonographic examination in both groups

| Feedback | Preexamination Mean (SD) | Postexamination Mean (SD) | t | P-value | 95% Confidence interval |
|--------------------|-----------------------------|------------------------------|--------|---------|-------------------------------|
| Interactive (N=23) | 72.2(8.3) | 80.7(5.4) | -6.423 | <0.001 | -11.22 to -5.74 |
| Normal (N=20) | 69.9(6.8) | 75.0(4.5) | -4.678 | <0.001 | -7.45 to -2.85 |

The changing score of the individual detail of MAAS question was analyzed (Table 3). Only one question (I have had the desire to read about or get information about the developing baby) showed a statistically significant (P = 0.044).

Table 3 Detail of the Maternal Antenatal Attachment Scale (MAAS)

| Item | Interactive feedback | | | Normal feedback | | | p-value |
|----------------------------|----------------------|----------|-----------|-----------------|----------|-----------|---------|
| | Increase | Decrease | No change | Increase | Decrease | No change | |
| Baby inside me | 62.5 | 4.3 | 30.4 | 55.0 | 15.0 | 30.0 | 0.587 |
| Emotional feeling | 52.2 | 8.7 | 39.1 | 40.0 | 20.0 | 40.0 | 0.385 |
| Positive/negative thinking | 17.4 | 43.5 | 39.1 | 30.0 | 25.0 | 45.0 | 0.395 |
| Data developing baby | 47.8 | 4.3 | 47.8 | 30.0 | 35.0 | 35.0 | 0.044 |
| Picture developing baby | 26.1 | 30.4 | 43.5 | 40.0 | 40.0 | 20.0 | 0.305 |
| Developing baby mostly | 26.1 | 17.4 | 56.5 | 40.0 | 20.0 | 40.0 | 0.563 |
| Baby dependent on me | 26.1 | 17.4 | 56.5 | 25.0 | 40.0 | 35.0 | 0.241 |
| Talking to baby | 65.2 | 8.7 | 26.1 | 35.0 | 15.0 | 50.0 | 0.137 |
| Thought about baby | 13.0 | 34.8 | 52.2 | 10.0 | 50.0 | 40.0 | 0.629 |
| Picture in my mind | 56.5 | 8.7 | 34.8 | 45.0 | 25.0 | 30.0 | 0.383 |
| Feeling about baby | 47.8 | 4.3 | 47.8 | 30.0 | 15.0 | 55.0 | 0.319 |
| Hurt/punish baby | 8.7 | 4.3 | 87.0 | 15.0 | 10.0 | 75.0 | 0.605 |
| Distant or closed | 30.4 | 8.7 | 60.9 | 25.0 | 35.0 | 40.0 | 0.110 |
| Eat to the baby | 30.4 | 26.1 | 43.5 | 25.0 | 30.0 | 45.0 | 0.999 |
| Expect I will feel | 8.7 | 26.1 | 65.2 | 5.0 | 40.0 | 55.0 | 0.627 |
| To hold the baby | 30.4 | 17.4 | 52.2 | 25.0 | 10.0 | 65.0 | 0.753 |
| Dream about | 26.1 | 21.7 | 52.2 | 50.0 | 20.0 | 30.0 | 0.224 |
| Where the baby | 39.1 | 8.7 | 52.2 | 50.0 | - | 50.0 | 0.533 |
| Pregnant loss | 73.9 | 8.7 | 17.4 | 65.0 | 10.0 | 25.0 | 0.886 |

The pre- and post-examination anxiety levels in the interactive feedback group was decreased from 39.17 to 35.52 ($P = 0.057$; Table 4) with no statistically significant, whereas unchanged in the normal feedback group (level 40.00 to 40.05; $P = 0.977$).

Table 4 Anxiety level

| Feedback | Pre-examination, mean (SD) | Post- examination, mean (SD) | P-value | 95% Confidence interval |
|--------------------|-------------------------------|------------------------------------|---------|-------------------------------|
| Interactive (N=23) | 39.17(7.03) | 35.52(5.77) | 0.057 | -0.12 to 7.42 |
| Normal (N=20) | 40.0(7.28) | 40.05(8.36) | 0.977 | -3.61 to 3.51 |

The analysis of post-examination showed that the MAAS score was significantly higher in the interactive group than the normal feedback group and the anxiety level was significantly lower in the interactive group than the normal feedback group. (80.68 vs 75.00, $P = 0.001$; 35.52 vs 40.05, $P = 0.043$; Table 5).

Table 5 Post-examination; comparisons of the Maternal Antenatal Attachment Scale (MAAS) and anxiety level between interactive feedback and normal feedback group

| | \bar{X} | S.D. | t | p-value | 95% Confidence interval |
|----------------------|-----------|------|--------|---------|-------------------------------|
| MAAS | | | | | |
| Interactive feedback | 80.69 | 5.38 | 3.722 | 0.001 | 2.60 to 8.79 |
| Normal feedback | 75.00 | 4.51 | | | |
| Anxiety level | | | | | |
| Interactive feedback | 35.52 | 5.77 | -2.087 | 0.043 | -8.91 to -0.15 |
| Normal feedback | 40.05 | 8.36 | | | |

Maternal health behavior cannot be able to analyze because of no cigarette smoking or alcoholic drinking during pregnancy in participants.

Discussion

In this clinical trial, maternal-fetal bonding was increased in the interactive feedback of ultrasonographic findings in adolescent pregnancy when compared with the normal feedback.

Previous study showed that the maternal-fetal bonding was significantly lower in adolescent pregnancy than adult pregnant woman in first trimester (70 (68.4, 72.2) vs 76.8 (75.4, 78.2) $P < 0.01$), but there were no significant in second or third trimester⁽¹⁵⁾, and the interactive feedback of ultrasonographic findings was responsible for this increasing bonding^(7,10). This present study showed that the maternal-fetal bonding was statistically significant increased post-examination in both interactive and normal feedback groups (72.21 to 80.69 vs 69.85 to 75.00; $P < 0.001$). In contrast, Boukydis CFZ et al⁽⁵⁾ concluded that only the ultrasound consultation (interactive feedback) group had a significant increasing maternal-fetal bonding compared with standard care (normal feedback) group ($P < 0.05$).

A Cochrane review 2010 concluded that there was insufficient evidence for high feedback (interactive feedback) or low feedback (normal feedback) during a prenatal ultrasound to reduce maternal anxiety was insufficient evidence⁽⁴⁾. These findings consistent with the results of this study. The mean anxiety level was not statistically significant decreased after post-examination in the interactive feedback group, and unchanged in the normal feedback group (39.17 to 35.52, $p = 0.057$ vs 40.00 to 40.05, $p = 0.997$). Contrastingly, Field T et al.⁽¹²⁾ concluded that pregnancy anxiety was increased as pregnancy progressed in only

no-feedback (normal feedback) group compared to feedback (interactive feedback) group ($p < 0.05$). Boukydis CFZ et al⁽⁷⁾ concluded a reducing maternal anxiety in ultrasound consultation (interactive feedback) group and standard care (normal feedback) group, and was statistically significant in ultrasound consultation group only ($p < 0.04$).

After examination, the data was compared between the interactive and the normal feedback group. The MAAS demonstrated the interactive feedback group had higher maternal-fetal bonding than the normal feedback groups (80.69 vs 75.00, $P = 0.001$). The maternal anxiety demonstrated that the normal feedback group had more anxiety level than the interactive feedback group (40.05 vs 35.52, $P = 0.043$). Both data were statistically significant.

The strength of this trial was the use of a randomized controlled design, a standardized tools to measure maternal-fetal bonding, completed questionnaires before and after examination, and use only one sonographer.

The limitation of this trial was a small sample size due to limited study time period. The effect of gravidity, previous ultrasound may impact on maternal-fetal bonding and interview questionnaires may be possible bias. It would be useful for future study to compare maternal-fetal bonding in the first gravidity and the first ultrasound, using only self-reported questionnaires. There was no data of maternal behavioral change in this study.

In conclusion, this study suggest that interactive feedback ultrasound increased maternal-fetal bonding and decreased maternal anxiety level in adolescent pregnancy.

This interactive feedback may be the interventions that support women for motherhood, mental health, and infant outcomes.

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Interactive Feedback of Obstetric Ultrasonographic Findings on Maternal-Fetal Bonding in Adolescent Pregnancy in Sunpasitthiprasong Hospital: A Randomized Controlled Trial

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Abstract

Objective: To study the effect of the interactive feedback of ultrasonographic findings on maternal-fetal bonding in adolescent pregnancy.

Material and Methods: A randomized controlled trial was conducted in antenatal care unit, Sunpasitthiprasong Hospital, Ubon Ratchathani, Thailand. Adolescent pregnant women who underwent a routine ultrasound examination at 16 to 28 weeks of gestation were randomized into two groups: 1) interactive feedback group or 2) normal feedback group. Self-reported questionnaires were completed for assessing maternal-fetal bonding by the Maternal Antenatal Attachment Scale (MAAS), Spielberger's anxiety level and health behavior, before undergoing ultrasound examinations in both groups. The same questionnaires were completed again at 4 weeks later.

Results: A total of 50 adolescent pregnancy were randomly assigned in one-to-one ratio to interactive feedback group and normal feedback group. There are 2 women and 5 women in interactive feedback group and normal feedback group were lost to follow up, left 23 women in interactive feedback group and 20 women in normal feedback group available for analysis. Obstetrical ultrasonography increased maternal-fetal bonding demonstrated by significant difference of MAAS in both groups ($P = 0.001$). The interactive feedback group showed better maternal-fetal bonding (significantly increased MAAS, $P=0.001$) and less anxiety level ($P=0.043$) in post-examination comparison.

Conclusion: Interactive feedback of ultrasonographic findings increased maternal-fetal bonding and reduced anxiety in adolescent pregnancy.

Keywords: interactive feedback, ultrasonographic finding, maternal-fetal bonding, adolescent pregnancy

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