ผลของโปรแกรมการให้ข้อมูลแบบองค์รวมต่อความรู้ ทัศนคติ และระดับความวิตกกังวลของสตรีตั้งครรภ์ที่ได้รับการเจาะน้ำคร่ำ

จิรัชญา เหล่าคมพฤฒาจารย์ ปร.ด.[1,4] สุภาวดี ตั้งใจ พย.บ.[2]
ธิติรัตน์ เหล่าคมพฤฒาจารย์ รป.ด.[3] อ้อยใจ กุชัยภูมิ พย.บ.[2]
ศิริพร มาสูงเนิน พย.บ.[2]

(วันรับบทความ: 9 ธันวาคม พ.ศ.2568/ วันแก้ไขบทความ: 9 กุมภาพันธ์ พ.ศ.2569/ วันตอบรับบทความ: 4 มีนาคม พ.ศ.2569)

บทคัดย่อ

การเจาะน้ำคร่ำเป็นหัตถการเพื่อการวินิจฉัยความผิดปกติทางโครโมโซมหรือพันธุกรรมของทารกในครรภ์ ซึ่งมักดำเนินการในสตรีตั้งครรภ์กลุ่มเสี่ยงสูง หัตถการดังกล่าวอาจก่อให้เกิดภาวะแทรกซ้อนและทำให้สตรีตั้งครรภ์เกิดความวิตกกังวลทั้งต่อกระบวนการตรวจและผลการตรวจ ดังนั้น ผู้วิจัยจึงได้พัฒนาโปรแกรมการให้ข้อมูลแบบองค์รวมเพื่อเสริมสร้างความรู้ ส่งเสริมทัศนคติเชิงบวกและลดระดับความวิตกกังวลของสตรีตั้งครรภ์อย่างมีประสิทธิภาพ การวิจัยกึ่งทดลองหนึ่งกลุ่มวัดผลก่อน-หลังการทดลองนี้ มีวัตถุประสงค์เพื่อศึกษาผลของโปรแกรมการให้ข้อมูลแบบองค์รวมต่อความรู้ ทัศนคติและระดับความวิตกกังวล กลุ่มตัวอย่างคือสตรีตั้งครรภ์ที่ได้รับการเจาะน้ำคร่ำ จำนวน 31 ราย คัดเลือกแบบเจาะจงตามเกณฑ์คัดเข้าและเหมาะสมต่อการวิจัยทางการพยาบาลในบริบทคลินิก ประเมินผลลัพธ์ก่อนและหลังการเข้าร่วมโปรแกรมและติดตามผล หลังจากนั้น 2 สัปดาห์ เครื่องมือที่ใช้ในการวิจัย ได้แก่ แบบวัดความรู้ ทัศนคติและความวิตกกังวล ผ่านการตรวจสอบความตรงเชิงเนื้อหาโดยผู้ทรงคุณวุฒิ มีค่า IOC เท่ากับ 0.67–1.00 ตรวจสอบความเชื่อมั่นของแบบวัดความรู้ ตามสูตร KR-20 เท่ากับ 0.78 ส่วนแบบวัดทัศนคติและความวิตกกังวล มีค่าสัมประสิทธิ์แอลฟาของครอนบาค 0.79 และ 0.82 ตามลำดับ วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนาและ repeated measures ANOVA

ผลการวิจัยพบว่า โปรแกรมการให้ข้อมูลแบบองค์รวมช่วยให้สตรีตั้งครรภ์มีความรู้และทัศนคติเชิงบวกอยู่ในระดับสูง ขณะที่ระดับความวิตกกังวลอยู่ในระดับต่ำ นอกจากนี้ เมื่อเปรียบเทียบคะแนนก่อนและหลังเข้าร่วมโปรแกรม รวมถึงระยะติดตามผล 2 สัปดาห์ พบว่าความรู้และทัศนคติเพิ่มขึ้น และระดับความวิตกกังวลลดลงอย่างมีนัยสำคัญทางสถิติที่ระดับ .05 โปรแกรมดังกล่าวมีประสิทธิผลในการเสริมสร้างความรู้และทัศนคติเชิงบวก รวมทั้งลดระดับความวิตกกังวล โดยเสนอแนะให้มีการศึกษาผลในระยะยาว การเปรียบเทียบกับรูปแบบการให้ข้อมูลอื่น และการพัฒนารูปแบบดิจิทัลหรือออนไลน์ เพื่อเพิ่มการเข้าถึงและความต่อเนื่องของข้อมูล

คำสำคัญ: การเจาะน้ำคร่ำ โปรแกรมให้ความรู้แบบองค์รวม ความรู้ ทัศนคติ ความวิตกกังวล

[1]อาจารย์ กลุ่มวิชาการพยาบาลมารดา ทารกและการผดุงครรภ์ คณะพยาบาลศาสตร์ มหาวิทยาลัยราชภัฏชัยภูมิ
[2]พยาบาลวิชาชีพ หน่วยงานห้องฝากครรภ์และวางแผนครอบครัว กลุ่มงานการพยาบาลผู้ป่วยนอก กลุ่มการพยาบาล โรงพยาบาลชัยภูมิ
[3]อาจารย์ คณะศิลปศาสตร์และวิทยาศาสตร์ มหาวิทยาลัยราชภัฏชัยภูมิ
[4]ผู้ประพันธ์บรรณกิจ Email: jungera2520@gmail.com โทรศัพท์: 081-6616725

The Effects of a Holistic Information Program on Knowledge, Attitudes, and Anxiety Levels among Pregnant Women Undergoing Amniocentesis

Jiratchaya Laokhompruttajarn Ph.D.[1,4] Supawadee Thangjai B.N.S[2]
Thitirat Laokhompruttajarn D.PA.[3] Ooijai Kuchaiyaphum B.N.S[2],
Siriporn Masoongnern B.N.S[2]

(Received Date: December 9, 2025, Revised Date: February 9, 2026, Accepted Date: March 4, 2026)

Abstract

Amniocentesis is a diagnostic procedure for detecting chromosomal or genetic abnormalities in the fetus commonly performed in high-risk pregnant women. The procedure may lead to complications and cause anxiety related to both the process and the test results. Therefore, the researcher developed a holistic information program to effectively enhance knowledge, foster positive attitudes, and reduce anxiety among pregnant women. This quasi-experimental one-group pretest–posttest study aimed to examine the effects of the holistic information program on knowledge, attitudes, and anxiety levels. The sample consisted of 31 pregnant women undergoing amniocentesis who were selected through purposive sampling according to set inclusion criteria and who were considered appropriate for nursing research within a clinical context. Outcomes were assessed before and after participation in the program and in a follow-up evaluation conducted two weeks later. The research instruments consisted of questionnaires measuring knowledge, attitudes, and anxiety related to amniocentesis. The content validity of the instruments was assessed by a panel of experts with Index of Item–Objective Congruence (IOC) values ranging from 0.67 to 1.00. The reliability of the knowledge questionnaire, determined using the Kuder–Richardson Formula 20 (KR-20), was 0.78, whereas the attitude and anxiety questionnaires demonstrated Cronbach's alpha coefficients of 0.79 and 0.82, respectively. Data were analyzed using descriptive statistics and repeated-measures ANOVAs.

The results showed that the holistic information program helped pregnant women achieve high levels of knowledge and positive attitudes, while reducing their anxiety levels low. Furthermore, comparisons of scores before and after participation and at the two-week follow-up revealed significant increases in knowledge and attitudes and a significant decrease in anxiety at the .05 level. The program effectively enhanced knowledge and positive attitudes and reduced anxiety levels. It is recommended to study long-term effects of the program and compare with other information delivery methods, as well as to develop digital or online formats to improve accessibility and continuity of information.

Keywords: amniocentesis, patient education, health knowledge, attitudes, anxiety

[1]Lecturer, Department of Maternal, Infant, and Midwifery Nursing Program, Faculty of Nursing, Chaiyaphum Rajabhat University.
[2]Nursing, Department of Antenatal Care and Family Planning Clinic, Outpatient Nursing Unit, Nursing Division, Chaiyaphum Hospital.
[3]Lecturer, Faculty of Liberal Arts and Science, Chaiyaphum Rajabhat University,
[4]Corresponding author, Email: jungera2520@gmail.com Tel: 081-6616725

Introduction

Amniocentesis is a medical procedure used to diagnose chromosomal or genetic abnormalities in the fetus.[1] The procedure involves inserting a needle through the abdominal wall to withdraw amniotic fluid for testing, typically performed at 16-18 weeks of gestation to help pregnant women and their families plan the pregnancy appropriately.[2] This test is generally indicated for high-risk pregnant women, such as those aged 35 years or older, carriers of genetic disorders, or those with abnormal screening results.[3,4] However, it is contraindicated in cases of premature placental abruption, placenta previa, or cervical incompetence, and genetic counseling should be provided prior to the procedure.[5] Amniocentesis may cause complications such as infection, leakage of amniotic fluid, or miscarriage; therefore, it should be performed by experienced physicians.[6]

Amniocentesis is considered a high-risk procedure that may threaten the safety of both the pregnant woman and the fetus, leading to fear and anxiety about complications such as miscarriage, bleeding, or amniotic fluid leakage, as well as concerns about test results that may indicate fetal abnormalities.[7] External factors such as cost, unfamiliarity with the hospital environment, healthcare personnel, and fear of pain also contribute to anxiety.[8] Generally, anxiety tends to decrease once the test results confirm that the fetus is normal.[9] However, during the waiting period for results, pregnant women often experience stress due to uncertainty and fear, which necessitates informational and psychological support to help them cope and adapt appropriately. Outcome measures were assessed before and after participation in the intervention, with a follow-up at two weeks to adequately capture changes in anxiety levels.[10]

According to statistics from the antenatal care and family planning unit, Outpatient nursing division at Chaiyaphum hospital, between 2021 and 2023, the number of pregnant women undergoing amniocentesis was 354, 415, and 443, respectively, with chromosomal abnormalities detected in 14, 18, and 21 cases, showing a continuous upward trend.[11] Interviews with pregnant women who underwent amniocentesis revealed fear and anxiety regarding the procedure and concerns about test results that might indicate fetal abnormalities. Currently, there is limited nurse-led holistic information program systematically evaluating knowledge, attitudes, and anxiety in the context of antenatal care. This holistic information program represents a nurse-led intervention and is part of ongoing quality improvement in antenatal nursing care.[12] It incorporates genetic counseling through flip charts and educational leaflets for home study.[11] However, there is still a lack of psychological support activities to reduce stress and anxiety, and no evaluation has been conducted on the knowledge, attitudes, and anxiety levels of pregnant women undergoing amniocentesis. Therefore, the researcher recognized the importance of this issue and developed a holistic information program in collaboration with the antenatal care and family planning unit, applying Rosenstock et al.'s health belief model[13], Leventhal and Johnson's self-regulation theory[14], and Lazarus and Folkman's Stress and Coping Theory[15] to create a program that effectively promotes knowledge, positive attitudes, and reduces anxiety among pregnant women undergoing amniocentesis.

Research Objectives

1. To examine the effects of a holistic information program on knowledge, attitudes, and anxiety levels among pregnant women undergoing amniocentesis.

2. To compare the mean scores of knowledge, attitudes, and anxiety levels among pregnant women undergoing amniocentesis at three time points: before participation in the holistic information program, one week after the intervention, and at 2 week follow-up.

Conceptual Framework of the Study

This study developed a conceptual framework based on the Health Belief Model, Self-Regulatory Theory, and Stress and Coping Theory to examine the effects of a holistic information program on pregnant women undergoing amniocentesis. The program aims to provide accurate information, enhance emotional support, and promote appropriate stress-coping strategies. It consists of a single 22-minute intervention session, with outcomes assessed before and immediately after participation, followed by a two-week follow-up. The conceptual framework of the study is summarized as follows.

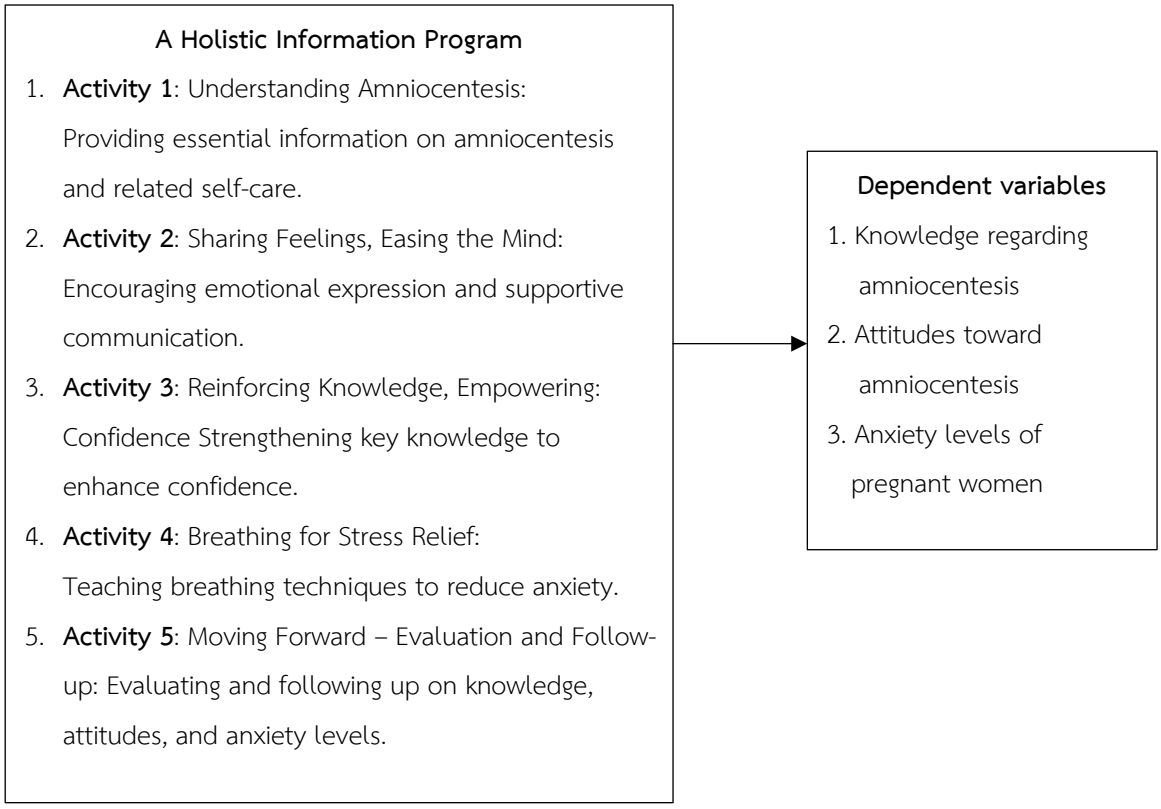


Figure 1 Conceptual Framework of the Study

The Scope of the Study

1. The target population and sample: Pregnant women who opted for prenatal diagnostic amniocentesis, purposively selected according to inclusion criteria, with gestational age of 15–20 weeks.

2. The Independent and dependent variables: The independent variable was the Holistic Information Program, and the dependent variables were knowledge regarding amniocentesis, attitudes toward amniocentesis, and anxiety levels of pregnant women.

3. The research setting at Antenatal and Family Planning Unit, Outpatient Nursing Department, Chaiyaphum Hospital.

4. The period of data collection: Data were collected from February 1 to July 31, 2025, over a period of six months.

Materials and Methods

Study Design: This study employed a quasi-experimental design using a one-group repeated measures approach. A non-equivalent control design was not feasible due to the clinical service context and ethical considerations. Data were collected at three time points: (1) prior to the intervention, (2) one week after the intervention, and (3) two weeks after the intervention.

Population and Sample:

The study population consisted of pregnant women who decided to undergo prenatal diagnostic testing via amniocentesis at the antenatal care and family planning unit, outpatient department, Chaiyaphum hospital.[11] The sample was purposively selected based on inclusion criteria: pregnant women at 15-20 weeks of gestation, natural conception, no pregnancy complications, no prior experience with amniocentesis, and the ability to read, write, and understand Thai. Exclusion criteria included pregnant women with complications during pregnancy, inability to complete the program, or occurrence of severe complications during participation, in accordance with research ethics standards.

The sample size was calculated using G*Power 3.1.9.4 for repeated measures ANOVA, with α = .05, statistical power (1-β) = 0.80, one group, three measurements, and a correlation among repeated measures of 0.5. Based on Cohen's guidelines[16], a small effect size required 163 participants, while a large effect size required only 12. A medium effect size was selected as single-session interventions typically yield moderate outcome changes, consistent with previous studies, ensuring sufficient power while remaining feasible in a clinical setting, resulting in a sample size of 28 participants. To account for a potential 10% attrition rate, the final sample size was 31 participants.

Research Instruments: This study utilized two types of instruments: those used for implementing the intervention and those used for data collection, as detailed below:

1. Instruments for implementing the intervention. This category consisted of two main components:

1.1 Component 1: The genetic information delivery format provided by the antenatal care and family planning unit, Chaiyaphum hospital, developed based on proactive health communication principles to promote knowledge, understanding, and informed decision-making among pregnant women regarding amniocentesis.[11] It included:

1.1.1 Flip chart teaching materials on amniocentesis, covering the definition, appropriate timing, procedure, test results, potential complications, and guidelines for pre- and post-procedure care, as well as home care instructions to ensure adequate knowledge and preparedness.

1.1.2 Printed leaflets on amniocentesis for pregnant women, designed for home review, with content aligned with the flip chart to reinforce understanding and retention.

1.2 Component 2: The holistic information program developed by the researcher through integration of the health belief model[13], self-regulation theory[14], and stress and coping theory[15], along with a review of related literature.[17-20] The program aimed to enhance medical understanding, foster positive attitudes, and effectively manage anxiety. It comprised five activities: 1) Understanding amniocentesis– providing knowledge via an application (7 minutes), 2) sharing feelings to relieve anxiety–allowing pregnant women and their families to express and exchange feelings (10 minutes), 3) reinforcing knowledge–reviewing essential pre- and post-procedure care information (5 minutes), (4) breathing for stress relief–practicing breathing and muscle relaxation techniques to reduce tension (10 minutes) and (5) moving forward – assessing knowledge, attitudes, and anxiety before and after participation, and conducting a two-week follow-up.

2. Instruments for data collection. This category consisted of five parts:

2.1 Part 1: A personal information record form developed by the researcher to collect demographic data, including age, education level, occupation, average monthly income, marital status, number of pregnancies, gestational age, readiness for pregnancy, and family history of genetic disorders. These data were used to describe the general characteristics of the sample.

2.2 Part 2: A knowledge assessment questionnaire on amniocentesis, developed by the researcher based on documents and medical guidelines from the department of health, ministry of public health[4]. It consisted of 15 true/false items. Interpretation followed Bloom's criteria [21]: scores of 12-15 indicated high knowledge, 9-11 moderate knowledge, and below 9 low knowledge.

2.3 Part 3: An attitude questionnaire regarding amniocentesis, developed by the researcher using a five-point Likert scale with 10 items. Scoring followed the criteria of Srisaad[22]: mean scores of 4.51-5.00 indicated very high attitude, 3.51-4.50 high, 2.51-3.50 moderate, 1.51-2.50 low, and 1.00-1.50 very low.

2.4 Part 4: An anxiety assessment tool adapted from the State-Trait Anxiety Inventory (STAI) by Spielberger CD.[23], using only the State Anxiety Form Y-1, which consists of 20 items (10 positive and 10 negative statements) rated on a four-point scale, for positively worded items, 1=minimal anxiety, 2= low anxiety, 3=moderate anxiety, and 4= high anxiety. For negatively worded items, scoring was reversed: 1= high anxiety, 2=moderate anxiety, 3=low anxiety, and 4=minimal anxiety. Total scores were interpreted as follows: 20-39 low anxiety, 40-59 moderate anxiety, and 60-80 high anxiety.

2.5 Part 5: An open-ended feedback questionnaire to allow participants to provide comments and suggestions regarding the program for future improvement.

Instrument Quality Assessment: The quality of the research instruments was evaluated through content validity and reliability testing. Content validity was assessed by three experts, including one obstetrician and two faculty members from the maternal, newborn, and midwifery nursing program. The experts reviewed the instruments for accuracy, appropriateness, and comprehensiveness. The Index of Item-Objective Congruence (IOC) ranged from 0.67 to 1.00. Language adjustments were made based on expert recommendations. Reliability was tested by piloting the instruments with 30 pregnant women undergoing amniocentesis who shared similar characteristics with the actual sample. The analysis revealed that the knowledge assessment tool achieved a KR-20 reliability coefficient of 0.78, while the attitude and anxiety questionnaires demonstrated Cronbach's alpha values of 0.82 and 0.79, respectively. These reliability coefficients were considered acceptable, indicating that the instruments were valid and suitable for use in this study.

Data Collection: After obtaining ethical approval from the Human Research Ethics Committee of Chaiyaphum hospital, data collection was conducted at the antenatal care and family planning unit, Chaiyaphum hospital. The process began with gathering personal information and administering questionnaires to assess knowledge, attitudes, and anxiety levels related to amniocentesis (5 minutes). Participants then received genetic counseling and were given the opportunity to ask questions (10 minutes). They viewed the "Amniocentesis" application (7 minutes)., learned pre- and post-procedure care guidelines, and practiced breathing and muscle relaxation techniques (10 minutes). At the end of the session, participants were provided with a handbook and a link to the application. On the day of the amniocentesis procedure, participants completed the questionnaires again, and follow-up assessments were conducted two weeks later. All data were then summarized and analyzed.

Ethical Considerations: This study was approved by the Human Research Ethics Committee of Chaiyaphum Hospital (Approval Code: 054/2567, dated January 13, 2025). The researcher implemented comprehensive measures to protect participants' rights. Prior to the study, ethical approval was obtained, and informed consent was clearly and voluntarily secured from all participants. During the study, confidentiality of data was maintained, participants were granted the right to withdraw at any time, and appropriate psychological support was provided. Upon completion, results were reported anonymously, and data were managed in accordance with ethical principles, reflecting full responsibility for participants' rights and well-being.

Data Analysis:

1. Descriptive statistics were used to analyze demographic characteristics, knowledge levels, attitudes, and anxiety among pregnant women undergoing amniocentesis, including frequency, percentage, mean, and standard deviation.

2. Inferential statistics were applied by first testing the normality of the dependent variables using the Kolmogorov–Smirnov test. For normally distributed data, the sphericity assumption was evaluated using Mauchly's test, which indicated a violation, $\chi^2(2) = 7.84$, $p = .02$; therefore, the degrees of freedom were adjusted using the Greenhouse–Geisser correction ($\varepsilon = 0.82$). Comparisons of scores across three time points were performed using Repeated Measures ANOVA, and pairwise differences were analyzed using Scheffé's method, with the significance level set at 0.05.

3. Open-ended questionnaire responses regarding additional suggestions were analyzed using content analysis.

Results

1. Knowledge, attitudes, and anxiety levels among pregnant women undergoing amniocentesis

1.1 General characteristics:

1.1.1 Most participants were aged 31–35 years (48.40%), had completed primary education (Grade 6) (35.50%), worked as laborers (38.70%), and earned a monthly income of 5,001-10,000 THB (38.70%). The majority were married (64.50%), in their second pregnancy (54.80%), at 18 weeks of gestation (61.30%), reported readiness for pregnancy (83.90%), and had no underlying diseases (87.10%).

1.1.2 Knowledge, attitude, and anxiety scores before participation, after participation, and at the two-week follow-up revealed that the mean knowledge score prior to the program was 8.26 (S.D. = 0.82), indicating a low level. After the program, the score increased to 11.26 (S.D.= 0.82), and at the two-week follow-up, it reached 13.45 (S.D.= 0.89), indicating a high level. For attitudes, the mean score before participation was 2.63 (S.D. = 0.32), indicating a moderate level. After the program, it increased to 4.07 (S.D.= 0.27), and at follow-up, 4.56 (S.D.= 0.15), indicating high to very high levels. For anxiety, the mean score before participation was 72.10 (S.D.= 4.50), indicating a high level. After the program, it decreased to 46.61 (S.D.= 3.95), and at follow-up, 25.68 (S.D.= 2.97), indicating moderate to low levels (see Table 1).

Table 1 Mean scores of knowledge, attitude, and anxiety levels regarding amniocentesis (n = 31)

	Before Participation			One week after Participation			Two-Week Follow-Up		
Variable	**Mean**	**S.D.**	**Interpretation**	**Mean**	**S.D.**	**Interpretation**	**Mean**	**S.D.**	**Interpretation**
Knowledge	8.26	0.82	Low	11.26	0.82	High	13.45	0.89	High
Attitude	2.63	0.32	Moderate	4.07	0.27	High	4.56	0.15	Very High
Anxiety	72.10	4.50	High	46.61	3.95	Moderate	25.68	2.97	Low

2. Comparison of scores across three time points by repeated measures ANOVA revealed that knowledge and attitude scores significantly increased across the three time points, while anxiety scores significantly decreased. All differences were statistically significant at the .05 level (see Table 2).

Table 2 Comparison of knowledge, attitude, and anxiety scores before, after, and two weeks following participation in the holistic information program (n = 31)

Variable	**Before Participation** Mean (S.D.)	**After Participation** Mean (S.D.)	**Two-Week Follow-Up** Mean (S.D.)	**df**	**Mean Square**	**F**	***p*-value**	**Partial Eta Squared**
Knowledge	8.26 (0.82)	11.26 (0.82)	13.45 (0.89)	1 30	11231.01 1.92	5843.81	.00*	.99
Attitude	2.63 (0.32)	4.07 (0.27)	4.56 (0.15)	1 30	1311.19 .07	19697.49	.00*	.99
Anxiety	72.10 (4.50)	46.61 (3.95)	25.68 (2.97)	1 30	215425.55 11.28	19095.09	.00*	.99

*Statistical significance at $p < .05$

Discussion

Following participation in the holistic information program, pregnant women undergoing amniocentesis demonstrated improved knowledge and more positive attitudes, while anxiety levels decreased consistently both immediately after the program and at the two-week follow-up. These findings indicate that the program effectively enhanced understanding, promoted positive perceptions, and reduced psychological stress among

pregnant women facing a high-stress medical situation. Furthermore, the findings highlight the important role of nurses within the Thai healthcare system, particularly in antenatal care settings, where nurses serve as frontline healthcare providers responsible for delivering information, providing counseling, and offering emotional support to pregnant women who must undergo high-risk and anxiety-provoking prenatal diagnostic procedures. The implementation of this holistic information-provision program represents a nurse-led intervention, which is well aligned with the context of the Thai healthcare system that emphasizes continuity of care, close relationships between healthcare providers and service recipients, and trust in the nursing role. A positive nurse–pregnant woman relationship facilitates open communication, emotional expression, and appropriate emotional support, which may be key factors in reducing anxiety and strengthening confidence in coping with medical procedures effectively. The results align with Rosenstock et al.'s Health Belief Model[13], which emphasizes that awareness of health risks and benefits, combined with accurate information, motivates individuals to adopt rational decision-making and health-promoting behaviors. They also correspond with Leventhal and Johnson's self-regulation theory[14], which suggests that clear health-related information enables individuals to assess situations, plan coping strategies, and regulate emotions more effectively. Furthermore, the findings are consistent with Lazarus and Folkman's stress and coping theory[15], which posits that cognitive appraisal and emotional support facilitate effective stress management. This study supports previous research which found that providing appropriate information and counseling for pregnant women undergoing amniocentesis significantly improved knowledge, fostered positive attitudes, and reduced fear and anxiety related to the procedure.[12,19,20,24] Similarly, previous research reported that health education on complications and post-procedure care, combined with psychological support, enhanced confidence and safety, thereby reducing anxiety.[25]

The significant increase in knowledge and attitude scores after the program, with continued improvement at the two-week follow-up, and the significant reduction in anxiety across all time points, reflect the program's effectiveness in promoting understanding and positive attitudes while alleviating anxiety associated with amniocentesis. When examined in terms of program components, the holistic information-provision program exhibited several key strengths. These included: (1) the provision of accurate and comprehensive information regarding amniocentesis and its potential outcomes, which helped reduce ambiguity and fear arising from uncertainty; (2) supportive communication and counseling that allowed pregnant women to ask questions freely and express their concerns openly; and (3) emotional empowerment through active listening, encouragement, and assistance in cognitive reappraisal of the situation. These components functioned synergistically and were well aligned with the theoretical frameworks of the Health Belief Model, Self-Regulatory Theory, and Stress and Coping Theory, resulting in systematic changes in cognitive, emotional, and behavioral dimensions among the study participants. In the knowledge dimension, the findings revealed a statistically significant increase in knowledge scores following program participation, with sustained high levels observed at the follow-up assessment. This suggests that the delivery of accurate, clear, and context-appropriate information effectively enhanced pregnant women's understanding of amniocentesis and self-care practices in a sustainable manner. Regarding the attitude dimension, the observed increase in attitude scores reflects a shift in pregnant women's perceptions of amniocentesis from viewing it as a frightening medical procedure to recognizing it as a beneficial

and necessary diagnostic process. This positive change in perspective facilitated informed decision-making and greater acceptance of medical care. In terms of anxiety, the continuous reduction in anxiety levels observed both immediately after the intervention and during the follow-up period highlights the emotional change mechanisms triggered by accurate information provision, emotional support, and strengthened coping capacity in dealing with uncertainty. These findings further reinforce the theoretical frameworks mentioned above, highlighting the role of accurate information and emotional support in reducing anxiety and improving coping strategies. Additionally, the results are consistent with international studies which demonstrated that providing information and psychological support significantly improved knowledge, attitudes, and reduced anxiety among pregnant women undergoing prenatal diagnostic procedures.[26-28] The international studies also reported that multimedia-based information delivery effectively enhanced knowledge, improved attitudes, and reduced anxiety and pain associated with amniocentesis before and after the procedure[29], with statistically significant results at the .05 level.

Conclusion

This study aimed to evaluate the effects of a holistic information program on knowledge, attitudes, and anxiety levels among pregnant women undergoing amniocentesis. The findings revealed that after participating in the program, participants' knowledge and attitudes improved continuously, while anxiety levels decreased significantly. Comparisons of scores before and after participation, as well as at the two-week follow-up, confirmed that the program effectively promoted knowledge and positive attitudes and helped pregnant women manage anxiety efficiently.

The results suggest that the holistic information program is a valuable tool for supporting pregnant women undergoing amniocentesis by enhancing knowledge, fostering positive attitudes, reducing anxiety, and building confidence in health-related decision-making. Implementing this program in clinical practice could improve the quality of maternal healthcare and strengthen comprehensive and effective genetic counseling services.

Study Limitations and Implications

For this study, the findings from the research titled "The Effects of a Holistic Information Program on knowledge, attitudes, and anxiety levels among pregnant women undergoing amniocentesis" were used. The researchers identified the following limitations and recommendations:

Study Limitations

This study was conducted in a single government hospital, which has unique characteristics that may differ from those of other hospitals. Therefore, the findings may not be generalizable to the broader population. In addition, the limited sample size and the use of a single assessment method may constrain the diversity and depth of the data.

Implications

1. Future research should employ a controlled study design, increase the sample size, and utilize diverse assessment methods to enhance the reliability of the findings and improve their generalizability to a wider population.

2. The holistic information program should be integrated into the pre-amniocentesis counseling process in clinical practice, with clearly defined roles and responsibilities for midwives, clinical nurses, and the multidisciplinary team to ensure effective coordination and comprehensive care for pregnant women.

3. The program should be expanded to antenatal clinics and other healthcare settings, with active involvement of family members, to maximize the program's impact, reduce anxiety, and support pregnant women in making informed health-related decisions.

Acknowledgments

The author would like to express their sincere gratitude to the experts who provided valuable feedback on the research instruments, the pregnant women and their families who willingly participated in the program, and the staff of the Antenatal Care and Family Planning Unit at Chaiyaphum Hospital for their financial support and assistance in facilitating the successful completion of this study. Additionally, the author gratefully acknowledges Chaiyaphum Rajabhat University for its financial support toward the publication of this research.

AI Declaration Statement

The author declares that AI tools, specifically Notebook LM and Claude, were used only to assist with language refinement and editing; all content, analysis, and interpretations were conducted and verified by the author.

References

1. American College of Obstetricians and Gynecologists. Genetic testing and amniocentesis. Washington (DC): ACOG; 2021.
2. Chantarat J. Nursing and midwifery: Women during pregnancy. Bangkok: Chulalongkorn University Press, Thailand; 2022. (in Thai).
3. Cunningham FG, Leveno KJ, Bloom SL, Dashe JS, Hoffman BL, Casey BM, et al. Williams Obstetrics. 25th ed. New York: McGraw-Hill Education; 2018.
4. Health Promotion Division, Department of Health, Ministry of Public Health. Training manual for the genetic counseling program for Down syndrome. Bangkok: War Veterans Organization Printing Office, Thailand; 2020. (in Thai)
5. Douglas S. Nursing and midwifery: A public health perspective. 2nd ed. London: SAGE Publications; 2020.
6. Jacob A. A comprehensive textbook of midwifery & gynecological nursing. 6th ed. New Delhi: Jaypee Brothers Medical Publishers; 2023.
7. Phillippi J, Kantrowitz-Gordon I. Varney's midwifery. 7th ed. Burlington (MA): Jones & Bartlett Learning; 2023.
8. Nagtalon-Ramos J, Escobar M. Kelsey's midwifery & women's health nurse practitioner certification review guide. 6th ed. Burlington (MA): Jones & Bartlett Learning; 2025.
9. Tharpe NL, Farley CL, Jordan RG. Clinical practice guidelines for midwifery & women's health. 6th ed. Burlington (MA): Jones & Bartlett Learning; 2021.
10. Lowdermilk DL, Cashion K. Maternity and women's health care. 13th ed. St. Louis (MO): Elsevier; 2023.

11. Antenatal Care and Family planning unit, Chaiyaphum hospital. Report on amniocentesis procedures from the Antenatal Care and Family planning unit, Chaiyaphum hospital. Chaiyaphum: Chaiyaphum hospital, Thailand; 2024. (in Thai)
12. Ponglopisit S, Wisuthimateenorn J, Pheungsontonsirimas K, Inta M. Assessment of second trimester genetic amniocentesis: A review of 6 years of experience at Sanpatong Hospital, a mid-level secondary hospital setting. Biomedical Sciences and Clinical Medicine 2024; 63(2):49-54. (in Thai)
13. Rosenstock IM. Historical origins of the health belief model. In: Becker MH, editor. The health belief model and personal health behavior. New Brunswick (NJ): Rutgers University Press; 1988.
14. Leventhal H, Johnson JE. Laboratory and field experimentation: Development of a theory of self-regulation. In: Wooldridge PJ, Schmitt MH, Skipper JK, Leonard RC, editors. Behavioral science and nursing theory. St. Louis: CV Mosby; 1983.
15. Lazarus RS, Folkman S. Stress, appraisal, and coping. New York: Springer; 1984.
16. Cohen J. Statistical power analysis for the behavioral sciences. New York: Academic Press; 1977.
17. Mojahed S, Reyhanizadeh F, Tabatabaei RS, Dehghani A. Evaluation of the effect of education on perceived stress of mother candidates for amniocentesis. Journal of Education and Health Promotion. 2021;30(10): 267-74. doi:10.4103/jehp.jehp_785_20.
18. Torun R, Sever B, Tuncer CS, Saglam C, Ozer M, Emiralioglu ÇZ, et al. Analysis of Amniocentesis results in a tertiary care center: A retrospective cohort study. Forbes Journal of Medicine. 2024;5(2):129-34. doi:10.4274/forbes.galenos.2024.44712
19. Kownaklai J, Kuasit U, Thaicharoen N. Exploring women's experiences of amniocentesis: A qualitative content analysis. Iranian Journal of Nursing and Midwifery Research. 2025;30(1):74-80. doi:10.4103/ijnmr.ijnmr_107_23.
20. Peterson JA, Szeto L, Wodoslawsky S, Futterman ID, Silverstein JS, Fiorentino DG, et al. Genetic counseling practices among outpatient obstetric providers in the Northeast. American Journal of Obstetrics & Gynecology MFM. 2023;5(11):101-5. doi:10.1016/j.ajogmf.2023.101150
21. Bloom BS. Human characteristics and school learning. New York: McGraw-Hill; 1976.
22. Srisaad B. Basic Research. 10th ed. Bangkok: Suweeriyasarn, Thailand; 2017. (in Thai)
23. Spielberger CD. Manual for the State-Trait Anxiety Inventory (Form Y). Palo Alto: CA: Consulting Psychologists Press; 1983.
24. Malakouti J, Mirghafourvand M, Dargahi R. The effect of education on perceived stress and anxiety in high-risk pregnant women awaiting amniocentesis: A quasi-experimental study. Journal of Midwifery & Reproductive Health. 2023;11(4):3946-58. doi:10.22038/jmrh.2023.65033.1898
25. Lumpo W, Saenthaweesuk A. Nurse-midwife role: Anxiety management of pregnant women about amniocentesis. Journal of Nursing and Health Science Research. 2022;14(2):309-24. (in Thai)

26. Tang W, Yuan Y, Jiang X, Liu X, Liang X. Prenatal diagnosis and genetic counseling of mosaicism for trisomy 7 in a single colony at amniocentesis with a favorable outcome. Taiwanese Journal of Obstetrics & Gynecology. 2012;1(60):390-1. doi:10.1016/j.tjog.2021.01.029
27. Wolder D, Blazuk-Fortak A, Michalska A, Detka K, Swiercz G, Kaczmarek P. Perinatal and delivery outcomes following amniocentesis: A case-control study in the Polish Population. Journal of Clinical Medicine. 2025;14(2):309-15. doi:10.3390/jcm14020309
28. Grgic G, Cerovac A, Hadžimehmedovic A, Bogdanovic G, Latifagic A. Genetic amniocentesis: Indications, outcome and complications retrospective cohort study during 13 years. Clinical and Experimental Obstetrics & Gynecology. 2021;48(6):1318-23. doi:org/10.31083/j.ceog4806209
29. Callioglu N, Kayaoglu YZ, Tuna G. The effect of video-based multimedia information before amniocentesis on pain, anxiety, and pregnancy outcomes. Scientific Reports. 2025;1(15):7742-6. doi:10.1038/s41598-025-90929-w