

Effectiveness of Online Acceptance and Commitment Therapy–Based Midwifery Counseling on Maternal–Fetal Attachment Among Women with Unintended Pregnancy: A Randomized Controlled

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Title

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Running Title

Online ACT-Based Midwifery Counseling for Maternal–Fetal Attachment

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Structured Abstract

Background

Unintended pregnancy is a major global public health concern and is associated with adverse psychological outcomes, impaired maternal well-being, and weaker maternal–fetal attachment. Acceptance and Commitment Therapy (ACT) has shown promising effects on improving psychological flexibility and emotional adaptation; however, evidence regarding the effectiveness of online ACT-based midwifery counseling for women experiencing unintended pregnancy remains limited. This randomized controlled trial aimed to evaluate the effectiveness of online Acceptance and Commitment Therapy (ACT)-based midwifery counseling on maternal–fetal attachment among women with unintended pregnancy.

Methods

This two-arm parallel randomized controlled trial was conducted among 60 women with unintended pregnancy attending three private obstetric and midwifery clinics in Neyshabour, Iran. Participants were randomly assigned in a 1:1 ratio to receive either eight individual online ACT-based midwifery counseling sessions delivered through synchronous video calls via the Eitaa platform or routine prenatal care. Maternal–fetal attachment was assessed using Cranley’s Maternal–Fetal Attachment Scale at baseline, immediately after the intervention, and two months after the intervention. Changes in maternal–fetal attachment scores over time were analyzed using repeated-measures analysis of variance, based on participants with complete outcome data at all three assessment time points. Statistical significance was set at $P < 0.05$. This randomized controlled trial was reported in accordance with the CONSORT 2010 statement..

Results

Baseline demographic, obstetric, and maternal–fetal attachment characteristics were comparable between the study groups. Compared with routine prenatal care, participants receiving online ACT-based midwifery counseling demonstrated significantly greater maternal–fetal attachment scores immediately after the intervention and at the two-month follow-up (both $P < 0.001$). Repeated-measures analysis of participants with complete maternal–fetal attachment data at all three assessment time points demonstrated significant effects of time ($P < 0.001$), study group ($P = 0.023$), and the group-by-time interaction ($P < 0.001$). The significant group-by-time interaction indicated that changes in maternal–fetal attachment over time differed between the two groups, with greater improvement observed in the intervention group.

Conclusions

Online Acceptance and Commitment Therapy–based midwifery counseling significantly improved maternal–fetal attachment among women with unintended pregnancy, with improvements maintained at the two-month follow-up. These findings suggest that integrating structured ACT-based counseling into routine prenatal care may enhance prenatal psychological adaptation and strengthen the maternal–fetal relationship in this population.

Trial Registration

The study was registered in the Iranian Registry of Clinical Trials (IRCT20251027067778N1) on 16 December 2025.

Keywords

Acceptance and Commitment Therapy; Maternal–Fetal Attachment; Unintended Pregnancy; Midwifery Counseling; Telehealth; Randomized Controlled Trial

Introduction

Unintended pregnancy remains a major public health challenge worldwide, affecting millions of women each year regardless of socioeconomic status or healthcare availability. According to the World Health Organization (WHO), nearly half of all pregnancies globally are unintended, making unintended pregnancy a persistent reproductive health concern with substantial psychological, social, and economic consequences. Women experiencing unintended pregnancy are more likely to report anxiety, depressive symptoms, psychological distress, decisional conflict, reduced utilization of prenatal care, and poorer maternal and neonatal outcomes than women with intended pregnancies (1–8).

Beyond its physical and obstetric consequences, unintended pregnancy may adversely influence maternal psychological adaptation during pregnancy. One of the most important psychological constructs during this period is maternal–fetal attachment, defined as the emotional bond that develops between a pregnant woman and her unborn child. Higher levels of maternal–fetal attachment have consistently been associated with healthier prenatal behaviors, greater maternal emotional well-being, improved preparation for motherhood, and more favorable neonatal outcomes. Conversely, unintended pregnancy has repeatedly been identified as a risk factor for weaker prenatal attachment, largely because women may initially experience ambivalence, uncertainty, or emotional conflict regarding the pregnancy (9–18).

Acceptance and Commitment Therapy (ACT) is a third-wave cognitive behavioral therapy that aims to improve psychological flexibility through acceptance of unpleasant internal experiences, cognitive defusion, present-moment awareness, values clarification, and committed action.

Rather than attempting to eliminate or control distressing thoughts and emotions, ACT encourages individuals to respond more adaptively to difficult life circumstances while engaging in behaviors that are consistent with their personally chosen values (19–27).

Growing evidence suggests that ACT effectively reduces anxiety, depression, stress, and experiential avoidance while improving psychological well-being across diverse clinical populations, including pregnant and postpartum women (28–36). Furthermore, systematic reviews and meta-analyses have demonstrated that digitally delivered ACT interventions produce improvements comparable to face-to-face interventions while increasing accessibility and reducing barriers to psychological care (37–45).

The rapid expansion of telehealth has created new opportunities to integrate evidence-based psychological interventions into routine maternity care. Online ACT-based counseling offers several practical advantages, including improved accessibility, reduced travel time and costs, greater scheduling flexibility, and enhanced privacy. These advantages may be particularly important for women with unintended pregnancy, who may hesitate to seek face-to-face psychological support because of stigma, emotional vulnerability, or limited access to specialized perinatal mental health services (46–53).

Previous randomized controlled trials have shown that counseling interventions—including cognitive behavioral therapy, attachment-based educational programs, and psychoeducational interventions—can improve maternal psychological adaptation and maternal–fetal attachment during pregnancy (54–60). However, evidence specifically evaluating online ACT-based

midwifery counseling among women with unintended pregnancy remains scarce. Moreover, most previous studies have focused primarily on anxiety, depression, or stress, whereas However, evidence specifically evaluating online ACT-based midwifery counseling among women with unintended pregnancy remains scarce. Moreover, most previous studies have focused primarily on anxiety, depression, or stress, whereas maternal–fetal attachment has received comparatively limited attention as a primary intervention outcome despite its important implications for maternal and neonatal health.

Therefore, this randomized controlled trial was conducted to evaluate the effectiveness of online Acceptance and Commitment Therapy-based midwifery counseling on maternal–fetal attachment among women experiencing unintended pregnancy.

METHODS

Study Design and Setting

This two-arm, parallel randomized controlled trial (RCT) was conducted to evaluate the effectiveness of online Acceptance and Commitment Therapy (ACT)-based midwifery counseling on maternal–fetal attachment among women with unintended pregnancy.

The study was conducted from December 2025 to June 2026 in three private outpatient clinics in Neyshabour, Razavi Khorasan Province, northeastern Iran, including one obstetrics and gynecology clinic and two midwifery clinics.

Participants were randomly allocated in a 1:1 ratio to either an intervention group receiving structured online ACT-based midwifery counseling in addition to routine prenatal care or a control group receiving routine prenatal care alone.

- The primary outcome was maternal–fetal attachment, which was assessed at baseline, immediately after completion of the intervention, and two months after the intervention.

The study protocol was approved by the Ethics Committee of Shahrood University of Medical Sciences (Approval No. IR.SHMU.REC.1404.098) and prospectively registered with the Iranian Registry of Clinical Trials (IRCT20251027067778N1). All procedures were conducted in accordance with the Declaration of Helsinki. Written informed consent was obtained from all participants before enrollment.

Participants and Eligibility

- Eligible participants were married women aged 15–40 years with an unintended pregnancy of less than 12 weeks' gestation who were attending the participating outpatient clinics during the study period. Potential participants were screened for eligibility by the principal investigator and recruited using convenience sampling.

- **Inclusion Criteria**

- Participants were eligible if they met all of the following criteria:
- being married;
- being aged 15–40 years;
- having a gestational age of less than 12 weeks;
- providing informed consent to participate;

- being able to read and write;
- having access to the internet and the Eitaa platform required for online counseling;
- having no self-reported history of physical or psychological illness;
- reporting the pregnancy as unintended by both the woman and her partner; and
- expressing a desire to terminate the pregnancy.
- **Exclusion Criteria**
- Participants were excluded if they had a history of receiving similar educational or counseling interventions or reported a serious physical or psychiatric condition requiring specialized treatment, such as psychotic disorders, schizophrenia, severe depression, or conditions requiring a specific medication or dietary regimen.
- **Attrition Criteria**
- Participants were considered lost to follow-up if they withdrew from the study, had incomplete questionnaires, exceeded the permitted number of missed intervention sessions, received similar counseling or education from outside the research team during the study, or experienced a major event during the study that prevented continued participation, such as pregnancy loss or a major bereavement.

Sample Size

The sample size was calculated based on the primary outcome (maternal–fetal attachment score) using data reported by Hosseini et al. (49), who evaluated the effects of cognitive-behavioral

midwifery counseling among women with unintended pregnancy. Assuming a two-sided significance level (α) of 0.05, a statistical power of 80% ($\beta = 0.20$), an expected mean difference of 8 points between groups, and standard deviations of 10.10 and 10.15 in the intervention and control groups, respectively, the required sample size was calculated as 29 participants per group after accounting for an anticipated 10% attrition rate. The target sample size was therefore set at 60 participants, with 30 participants allocated to each group.

Randomization, Allocation Concealment, and Blinding

An independent biostatistician who was not involved in participant recruitment or intervention delivery generated the random allocation sequence using computer-generated permuted block randomization with a fixed block size of four and a 1:1 allocation ratio.

Allocation concealment was maintained using sequentially numbered, opaque, sealed, and coded envelopes prepared according to the randomization sequence. After eligibility was confirmed and written informed consent was obtained, the principal investigator enrolled eligible participants consecutively. The envelope corresponding to each participant's recruitment order was then opened to reveal the assigned study group.

Participants and the principal investigator were blinded to group allocation before initiation of the intervention. Because of the nature of the psychological intervention, blinding could not be maintained after intervention initiation. Participants completed the baseline and follow-up assessments using the same standardized, self-administered questionnaire at the predefined assessment time points. The principal investigator distributed, collected, and recorded the completed questionnaires according to a standardized protocol.

To minimize detection and analysis bias, the statistical analyses were performed by the independent biostatistician, who remained blinded to treatment allocation. The dataset was anonymized and coded using group labels, and group identities were disclosed only after completion of the primary statistical analyses.

Intervention

The intervention protocol was developed based on ACT Made Simple by Russ Harris and was specifically adapted to address the psychological needs of women experiencing unintended pregnancy. The adaptation of the counseling content, therapeutic metaphors, experiential exercises, and session structure was performed by the principal investigator under the supervision and approval of the psychological consultant.

Participants allocated to the intervention group received eight individual online ACT-based midwifery counseling sessions delivered through synchronous video calls via the Eitaa platform. Each session lasted approximately 45 minutes and was conducted every other day at pre-scheduled appointment times. If technical problems such as internet disruption occurred, the session was rescheduled and completed on the same day whenever possible or, if necessary, on the following day to maintain the planned intervention schedule.

Reminder messages were sent before each counseling session to improve attendance. Participants who missed one scheduled session received an individual make-up session on the same day or the following day. Participants missing more than two sessions were excluded according to the predefined study protocol.

Each counseling session incorporated therapist-guided experiential exercises, mindfulness practices, therapeutic metaphors, psychoeducation, guided discussion, and structured homework

assignments. Homework was delivered through the Eitaa messaging platform and reviewed at the beginning of the subsequent session to reinforce learning and promote the application of ACT principles in daily life.

The intervention addressed the six core ACT processes, including acceptance, cognitive defusion, present-moment awareness, self-as-context, values clarification, and committed action, with the aim of enhancing psychological flexibility and strengthening maternal–fetal attachment.

A detailed description of the intervention sessions is presented in Table 1. Intervention fidelity was monitored throughout the trial by the research supervisor through periodic review of the counseling process to ensure adherence to the intervention protocol and consistency across all counseling sessions. No participant received any additional structured psychological intervention during the study period.

Table 1. Content of the Online ACT-Based Midwifery Counseling Program

Session	ACT Core Process	Objectives	Therapeutic Components		Expected Effect on Maternal–Fetal Attachment
			and Experiential Exercises	Homework	
1	Introduction to ACT & Creative Hopelessness	Establish therapeutic rapport, introduce ACT principles, increase awareness of	Introduction to ACT and its six core processes; discussion of experiential avoidance and psychological flexibility; supportive exploration of pregnancy-	Observe distressing thoughts without attempting to suppress them and record	Reduces resistance toward pregnancy-related emotions, increases openness to the pregnancy experience, and creates the psychological foundation for maternal–fetal attachment and

Session	ACT Core Process	Therapeutic Components			Expected Effect on Maternal–Fetal Attachment
		Objectives	and Experiential Exercises	Homework	
2	Acceptance	internal experiences, and facilitate emotional expression regarding unintended pregnancy.	related thoughts; Hard Cover Metaphor.	emotional reactions.	supports emotional openness to the pregnancy experience.
		Increase willingness to experience difficult thoughts and emotions while reducing experiential avoidance. Identify personal and family values related to pregnancy.	Acceptance training; exploration of personal values; Passengers on the Bus exercise.	Practice acceptance during emotionally difficult situations and reflect on value-consistent behaviors.	Improves emotional acceptance of pregnancy, decreases avoidance of pregnancy-related experiences, and Improves emotional acceptance of pregnancy, decreases experiential avoidance, and supports psychological flexibility and value-consistent coping.

Session	ACT Core Process	Objectives	Therapeutic Components		Expected Effect on Maternal–Fetal Attachment
			and Experiential Exercises	Homework	
3	Cognitive Defusion	Help participants observe thoughts as mental events rather than objective truths and reduce the influence of distressing cognitions.	Repeating a Word Exercise; Leaves on a Stream mindfulness exercise; discussion of common cognitive distortions during unintended pregnancy.	Practice cognitive defusion whenever distressing thoughts occur.	Reduces fear, guilt, and catastrophic thinking, Reduces fear, guilt, and catastrophic thinking, allowing participants to respond more flexibly to pregnancy-related experiences and become emotionally available for developing maternal–fetal attachment.
		Increase present-moment awareness and reduce rumination about the past and future.	Guided mindfulness practices including Body Scan and Mindful Observation (Mindful Eating) exercises.	Daily mindfulness practice and recording present-moment experiences.	Enhances emotional regulation, reduces stress and anxiety, promotes awareness of fetal movements and bodily experiences, and strengthens early and strengthens maternal–fetal attachment.
5	Values Clarification	Identify core life values, strengthen	Structured Values Worksheets; Values Notebook exercise;	Complete the Values Workbook and	Strengthens maternal identity, increases emotional investment in pregnancy, promotes meaningful

Session	ACT Core Process	Objectives	Therapeutic Components		Expected Effect on Maternal–Fetal Attachment
			and Experiential Exercises	Homework	
6	Committed Action	maternal identity, and encourage value-based living.	discussion of important life domains including motherhood, family, relationships, and health.	identify one daily value-based behavior.	interaction with the fetus, and Strengthens maternal identity, increases emotional investment in pregnancy, promotes meaningful interaction with the fetus, and supports value-consistent maternal behaviors.
		Translate personal values into realistic behavioral goals and strengthen commitment to meaningful actions.	Development of individualized action plans using the Small Steps Toward Values exercise; identification of barriers and coping strategies.	Implement one value-based behavioral goal and monitor progress.	Encourages active engagement in healthy pregnancy behaviors, reinforces maternal role acceptance, reinforces maternal role acceptance, and supports sustained commitment to value-consistent maternal behaviors.
		Develop the observing self, reduce over-identification with distressing	Guided Observing Self exercise; mindfulness of awareness practice; Sky and Weather metaphor.	Practice observing thoughts and emotions from the perspective	Reduces self-judgment, enhances emotional resilience, improves coping with pregnancy-related stressors, and supports stronger maternal–fetal attachment.
7	Self-as-Context				

Session	ACT Core Process	Therapeutic Components			Expected Effect on Maternal–Fetal Attachment
		Objectives	and Experiential Exercises	Homework	
8	Integration and Maintenance	thoughts, and enhance psychological flexibility.		of the observing self.	
		Consolidate ACT skills, reinforce psychological flexibility, and develop a personalized maintenance plan for pregnancy and future motherhood.	Review of all ACT processes; Future Self Visualization exercise; development of an individualized maintenance plan.	Continue independent ACT practice using the personalized maintenance plan.	Maintains therapeutic gains, supports long-term maternal–fetal attachment, strengthens confidence in motherhood, and Maintains therapeutic gains, supports long-term maternal–fetal attachment, strengthens confidence in the maternal role, and promotes sustained value-based behaviors.

Control Group

Participants allocated to the control group received routine prenatal care according to the Iranian national maternal healthcare guidelines and did not receive any structured ACT-based psychological counseling during the study period. After completion of data collection, an

educational pamphlet on maternal–fetal attachment was provided to participants in the control group as an ethical consideration.

Outcome Measures

Baseline demographic and obstetric characteristics were collected using a researcher-developed questionnaire that included maternal age, spouse's age, educational level, occupation, household income, duration of marriage, gravidity, parity, gestational age, history of abortion, fetal sex, and parental preference regarding fetal sex.

Maternal–Fetal Attachment

Maternal–fetal attachment was assessed using the Cranley Maternal–Fetal Attachment Scale (MFAS), one of the most widely used instruments for evaluating prenatal maternal attachment. The MFAS consists of 24 items rated on a five-point Likert scale ranging from definitely no (1) to definitely yes (5), yielding total scores from 24 to 120, with higher scores indicating stronger maternal–fetal attachment. The questionnaire evaluates five dimensions: differentiation of self from the fetus, interaction with the fetus, attributing characteristics to the fetus, giving of self, and role taking. The Persian version has demonstrated satisfactory psychometric properties, with an overall Cronbach's alpha coefficient of 0.85 reported in previous validation studies (52).

Study Procedure

After eligibility screening and written informed consent, baseline assessments were completed before randomization. Participants were then randomly allocated to either the intervention or the control group. Women assigned to the intervention group received eight individual online ACT-based midwifery counseling sessions in addition to routine prenatal care, whereas those assigned to the control group received routine prenatal care alone.

Maternal–fetal attachment was assessed using self-administered questionnaires completed independently by the participants at baseline, immediately after completion of the intervention, and two months after the intervention to evaluate both immediate and sustained intervention effects. No intervention-related adverse events were reported during the study.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics for Windows, Version 26.0 (IBM Corp., Armonk, NY, USA).

Continuous variables are presented as mean $\pm$ standard deviation (SD), whereas categorical variables are presented as frequencies and percentages. The normality of continuous variables was assessed using the Shapiro–Wilk test and visual inspection of histograms and Q–Q plots.

Baseline demographic and obstetric characteristics were compared between groups using the independent-samples t-test for continuous variables and Pearson's chi-square test or Fisher's exact test, as appropriate, for categorical variables.

Changes in maternal–fetal attachment scores over time were analyzed using repeated-measures analysis of variance (RM-ANOVA) among participants with complete data at all three assessment points. When the assumption of sphericity was violated, the Greenhouse–Geisser correction was applied.

All statistical tests were two-sided, and a P value < 0.05 was considered statistically significant.

RESULTS

Participant Flow

A total of 60 women with unintended pregnancy were randomized to either the intervention group (n = 30) or the control group (n = 30). All participants received their allocated intervention or routine prenatal care. During follow-up, five participants in the intervention group and three participants in the control group were lost to follow-up. Consequently, complete maternal–fetal attachment data at all three assessment time points were available for 25 participants in the intervention group and 27 participants in the control group. These 52 participants were included in the repeated-measures analysis. The flow of participants throughout the study is presented in Figure 1.

CONSORT

Assessed for eligibility (n = 62)

↓

Excluded (n = 2)

- Unable to access the Eitaa platform (n = 1)
- Declined to participate (n = 1)

↓

Randomized (n = 60)



Intervention group

Allocated to intervention (n = 30)

- Received allocated intervention (n = 30)

↓

Lost to follow-up (n = 5)

- Withdrawal from the counseling sessions (n = 2)
- No response to researcher follow-up attempts (n = 1)
- Received similar counseling outside the research team (n = 1)
- Decided to terminate the pregnancy and withdrew from the study (n = 1)

↓

Analyzed (n = 25)

- Complete MFAS data available at all three assessment time points
-

Control group

Allocated to control (n = 30)

- Received routine prenatal care (n = 30)

↓

Lost to follow-up (n = 3)

- Withdrawal from the study and inability to establish follow-up contact (n = 1)
- Spontaneous abortion (n = 1)
- Husband's lack of consent to continue study participation and questionnaire completion
(n = 1)

↓

Analyzed (n = 27)

- Complete MFAS data available at all three assessment time points

Figure 1. CONSORT flow diagram of participant enrollment, randomization, follow-up, and analysis.

Baseline Characteristics

Baseline demographic and obstetric characteristics of the participants are presented in Table 2.

The intervention and control groups were comparable across all baseline variables. No statistically significant between-group differences were observed with respect to maternal age, spouse age, maternal or paternal educational level, employment status, household income, duration of marriage, gestational age, gravidity, previous abortion, fetal sex, or parental preference regarding fetal sex (all $P > 0.05$).

The mean maternal age was 28.16 ± 5.06 years in the intervention group and 27.56 ± 3.74 years in the control group ($P = 0.604$). Likewise, no statistically significant differences were identified in maternal educational level ($P = 0.385$), paternal educational level ($P = 0.934$), maternal occupation ($P = 0.227$), household income ($P = 0.057$), gestational age ($P = 0.636$), or previous abortion history ($P = 0.448$). These findings indicate successful randomization and baseline comparability between the two study groups.

Baseline Characteristics of Participants

Table 2. Baseline demographic and obstetric characteristics of participants

Characteristic	Intervention (n = 30)	Control (n = 30)	P value
Maternal age (years), Mean ± SD	28.16 ± 5.06	27.56 ± 3.74	0.604
Spouse age (years), Mean ± SD	31.90 ± 5.08	31.76 ± 4.18	0.912
Maternal education, n (%)			0.385
Under diploma	7 (23.3)	8 (26.7)	
Diploma/Associate degree	7 (23.3)	7 (23.3)	
Bachelor's degree	10 (33.3)	12 (40.0)	
Master's degree or higher	6 (20.0)	3 (10.0)	
Spouse education, n (%)			0.934
Under diploma	7 (23.3)	6 (20.0)	
Diploma/Associate degree	7 (23.3)	9 (30.0)	
Bachelor's degree	8 (26.7)	9 (30.0)	
Master's degree or higher	8 (26.7)	6 (20.0)	
Maternal occupation, n (%)			0.227
Housewife	13 (43.3)	15 (50.0)	

Characteristic	Intervention (n = 30)	Control (n = 30)	P value
Self-employed	5 (16.7)	1 (3.3)	1.000
Employee	12 (40.0)	14 (46.7)	
Spouse occupation, n (%)			
Self-employed	13 (43.3)	13 (43.3)	0.057
Employee	17 (56.7)	17 (56.7)	
Monthly household income, n (%)			
<10 million Tomans	13 (43.3)	5 (16.7)	0.304
10–20 million Tomans	8 (26.7)	15 (50.0)	
>20 million Tomans	9 (30.0)	10 (33.3)	
Duration of marriage (years), Mean $\pm$ SD	3.56 $\pm$ 2.41	4.20 $\pm$ 2.31	0.636
Gestational age (weeks), Mean $\pm$ SD	9.66 $\pm$ 0.95	9.53 $\pm$ 1.19	
Gravidity, n (%)			
Primigravida	14 (46.7)	13 (43.3)	0.857
Gravida 2	10 (33.3)	10 (33.3)	
Gravida $\geq$ 3	6 (20.0)	7 (23.3)	

Characteristic	Intervention (n = 30)	Control (n = 30)	P value
History of abortion, n (%)			0.448
No	25 (83.3)	27 (90.0)	
Yes	5 (16.7)	3 (10.0)	
Maternal preferred fetal sex, n (%)			0.438
Male	14 (46.7)	17 (56.7)	
Female	16 (53.3)	13 (43.3)	
Spouse preferred fetal sex, n (%)			0.796
Male	15 (50.0)	16 (53.3)	
Female	15 (50.0)	14 (46.7)	
Fetal sex, n (%)			0.703
Male	17 (68.0)	17 (63.0)	
Female	8 (32.0)	10 (37.0)	

Table Footnote

Values are presented as mean $\pm$ standard deviation (SD) or number (%). Continuous variables were compared using the independent-samples t-test. Categorical variables were compared using Pearson's chi-square test or Fisher's exact test where appropriate.

Maternal–Fetal Attachment

Maternal–fetal attachment scores at baseline, immediately after the intervention, and two months after the intervention are presented in Table 3. At baseline, there was no statistically significant difference between the intervention and control groups (56.07 ± 10.04 vs. 58.93 ± 8.21 ; $P = 0.231$), indicating comparable prenatal attachment before the intervention.

Immediately after completion of the intervention, maternal–fetal attachment scores increased significantly in the intervention group compared with the control group (69.11 ± 10.37 vs. 58.29 ± 7.55 ; $P < 0.001$). This difference remained statistically significant at the two-month follow-up (66.96 ± 8.93 vs. 59.26 ± 7.81 ; $P < 0.001$), demonstrating sustained improvement following the intervention.

Table 3. Maternal–Fetal Attachment Scores Before, Immediately After, and Two Months After the Intervention

Assessment Time	Intervention (Mean $\pm$ SD)	Control (Mean $\pm$ SD)	Mean Difference	P value
Baseline	56.07 ± 10.04	58.93 ± 8.21	-2.86	0.231
Immediately after intervention	69.11 ± 10.37	58.29 ± 7.55	$+10.82$	<0.001
Two-month follow-up	66.96 ± 8.93	59.26 ± 7.81	$+7.70$	<0.001

Footnote

Data are presented as mean $\pm$ standard deviation (SD). Between-group comparisons were performed using the independent-samples t-test.

Changes Over Time

Changes in maternal–fetal attachment over time were evaluated using repeated-measures analysis of variance (Table 4). A significant main effect of time was observed ($F = 49.308$, $P < 0.001$), indicating that maternal–fetal attachment changed significantly across the three assessment points. A significant main effect of group was also found ($F = 5.468$, $P = 0.023$), reflecting overall differences between the intervention and control groups. Moreover, the significant group-by-time interaction ($F = 70.851$, $P < 0.001$) demonstrated that the pattern of change over time differed significantly between groups, with participants receiving online ACT-based midwifery counseling showing substantially greater improvements in maternal–fetal attachment than those receiving routine prenatal care. Because the assumption of sphericity was violated, the Greenhouse–Geisser correction was applied.

Table 4

Repeated Measures ANOVA

Source	F	P value
Time	49.31	<0.001
Group	5.47	0.023
Time × Group	70.85	<0.001

Footnote:

Greenhouse–Geisser correction was applied because the assumption of sphericity was violated. Because the assumption of sphericity was violated, the Greenhouse–Geisser correction was applied during repeated-measures analysis.

Discussion

Principal Findings

This randomized controlled trial evaluated the effectiveness of online Acceptance and Commitment Therapy (ACT)-based midwifery counseling on maternal–fetal attachment among women experiencing unintended pregnancy. The findings demonstrated that participants who received the ACT-based intervention experienced significantly greater improvements in maternal–fetal attachment than those receiving routine prenatal care alone. Importantly, these improvements were observed immediately after completion of the intervention and remained significant two months later, indicating sustained intervention effects over time.

Baseline maternal–fetal attachment scores and demographic characteristics were comparable between the two groups, suggesting that the observed between-group differences were unlikely to be explained by measured baseline characteristics. The persistence of treatment effects at the two-month follow-up may suggest that the intervention had effects extending beyond immediate emotional changes.

The present findings also support the feasibility of delivering structured psychological counseling through an online platform during pregnancy. The successful implementation of eight videoconference counseling sessions, together with sustained improvements during follow-up, suggests that telehealth-based ACT may represent a practical and accessible approach for promoting maternal psychological well-being, particularly in settings where access to face-to-face psychological services is limited. The successful implementation of eight videoconference counseling sessions, together with sustained improvements during follow-up, suggests that telehealth-based ACT may represent a practical and accessible approach for promoting maternal psychological well-being, particularly in settings where access to face-to-face psychological

services is limited.

Comparison with Previous Studies: Maternal–Fetal Attachment

The present findings demonstrated that online ACT-based midwifery counseling significantly improved maternal–fetal attachment among women experiencing unintended pregnancy. These findings are consistent with previous randomized controlled trials showing that structured psychological interventions can strengthen prenatal attachment and improve maternal psychological adaptation during pregnancy.

Hoseini et al. reported that cognitive-behavioral counseling significantly enhanced maternal–fetal attachment among women with unintended pregnancy, whereas Hasanzadeh et al. demonstrated that structured attachment-skills training improved prenatal attachment in women experiencing unintended first pregnancies. Similarly, Jangjoo et al. found that counseling interventions significantly strengthened maternal–fetal attachment among women with unintended pregnancies. Although these studies employed different therapeutic approaches, all support the conclusion that structured psychological counseling positively influences the emotional relationship between a mother and her unborn child (49, 76, 77, 79, 103–106).

The present study extends this evidence by demonstrating that Acceptance and Commitment Therapy can be effectively delivered through an entirely online midwifery counseling program. Unlike previous studies that primarily evaluated face-to-face counseling, the current intervention achieved sustained improvements using synchronous videoconference sessions, highlighting the potential of telehealth to expand access to evidence-based psychological care during pregnancy.

Our findings are also consistent with observational studies showing that greater maternal psychological well-being, perceived social support, mindfulness, and marital satisfaction are associated with stronger maternal–fetal attachment, whereas unintended pregnancy, maternal

anxiety, depression, and psychological distress are associated with weaker prenatal attachment (3, 18, 21–29, 66, 72, 73, 75, 78, 91, 93, 96–100).

Furthermore, the persistence of treatment effects at the two-month follow-up suggests that ACT may facilitate enduring psychological changes rather than transient emotional improvement. This interpretation is supported by ACT theory, which proposes that improvements in psychological flexibility enable individuals to develop healthier relationships with distressing internal experiences while maintaining behaviors that are consistent with their personal values (30, 32, 45–48, 55–57, 81).

Possible mechanisms underlying the intervention effects

Several psychological mechanisms may help explain the beneficial effects of ACT on maternal–fetal attachment observed in the present study. Acceptance and Commitment Therapy aims to enhance psychological flexibility, defined as the ability to remain in contact with difficult thoughts and emotions while engaging in behaviors consistent with personally chosen values. Rather than attempting to suppress or eliminate psychological distress, ACT emphasizes acceptance of internal experiences, cognitive defusion, present-moment awareness, self-as-context, values clarification, and committed action (30, 32, 55–57, 81).

Women experiencing unintended pregnancy may experience uncertainty, guilt, fear, anxiety, and emotional conflict, which may interfere with the development of maternal–fetal attachment. By promoting psychological flexibility, ACT may help women acknowledge these emotional experiences without allowing them to interfere with the gradual development of an emotional bond with the fetus. Through mindfulness exercises, experiential techniques, and values-based behavioral planning, participants may become more emotionally engaged with their pregnancy despite ongoing psychological distress.

Values clarification may have played an important role in the present intervention. During counseling, participants explored personally meaningful life domains, including motherhood, family relationships, and future aspirations. As behavioral choices became increasingly aligned with these values, emotional engagement with the pregnancy may also have increased, potentially strengthening maternal–fetal attachment. This interpretation is consistent with ACT theory, which emphasizes value-consistent behavior rather than symptom elimination alone (30, 55, 56).

The improvement observed at the two-month follow-up suggests that the benefits of the intervention may have persisted beyond the end of counseling. However, because psychological flexibility and other potential mediating mechanisms were not directly assessed in this study, these proposed mechanisms should be interpreted as hypotheses for future research.

Clinical implications

The findings of the present study have implications for maternity care. Women experiencing unintended pregnancy may have psychological and emotional needs that extend beyond routine obstetric care. Integrating structured psychological counseling into antenatal services may facilitate healthier emotional adaptation to pregnancy and support maternal–fetal attachment during the prenatal period.

Acceptance and Commitment Therapy may be particularly suitable for this population because it focuses on enhancing psychological flexibility rather than requiring the elimination of emotional distress. This approach may help pregnant women respond more adaptively to uncertainty, anxiety, and emotional conflict while maintaining behaviors consistent with their personal values.

An important feature of the present intervention was its online delivery format. Synchronous video-based counseling may reduce geographical and logistical barriers to accessing psychological support during pregnancy and may provide a feasible option for women who experience difficulties accessing face-to-face services.

From a healthcare systems perspective, integrating structured online ACT-based counseling into midwifery services may represent a practical approach to supporting maternal psychological well-being and prenatal attachment. Midwives are well positioned to identify women experiencing unintended pregnancy and facilitate timely, evidence-based psychological support as part of comprehensive, woman-centered antenatal care.

Strengths and limitations

This study has several strengths. The randomized controlled design, standardized intervention protocol, delivery of eight structured counseling sessions, and two-month follow-up strengthen the internal validity of the findings. In addition, the successful delivery of the intervention through synchronous online counseling supports the feasibility of providing structured psychological support remotely within maternity care.

Several limitations should also be acknowledged. Participants were recruited from three private obstetric and midwifery clinics in a single geographical region, which may limit the generalizability of the findings. The follow-up period was limited to two months, precluding evaluation of longer-term effects throughout pregnancy and the postpartum period. Maternal–fetal attachment was assessed using a self-report questionnaire and may therefore be subject to response bias. In addition, blinding of participants and the intervention provider could not be maintained after initiation of the psychological intervention because of its nature. Finally, the

repeated-measures analysis was based on participants with complete maternal–fetal attachment data at all three assessment time points, which may introduce attrition-related bias.

Future multicenter randomized controlled trials with larger and more diverse populations, longer follow-up periods extending into the postpartum period, and assessment of additional maternal psychological outcomes are warranted to confirm and extend the present findings.

Conclusions

In conclusion, the findings of this randomized controlled trial demonstrate that online Acceptance and Commitment Therapy (ACT)-based midwifery counseling significantly improved maternal–fetal attachment among women experiencing unintended pregnancy. The intervention produced significant improvements immediately after completion of counseling, and these benefits were maintained throughout the two-month follow-up period, suggesting sustained positive effects on prenatal maternal attachment.

These findings support the potential value of integrating structured online ACT-based counseling into routine antenatal care for women experiencing unintended pregnancy. By enhancing psychological flexibility and facilitating healthier emotional adaptation to pregnancy, this intervention may strengthen the maternal–fetal relationship while providing an accessible and feasible model of psychological support. Nevertheless, larger multicenter randomized controlled trials with longer follow-up periods are needed to confirm these findings and evaluate their generalizability across different populations and healthcare settings.

Consent for Publication

Not applicable.

Ethics Approval and Consent to Participate

This study was approved by the Ethics Committee of Shahroud University of Medical Sciences, Shahroud, Iran (Approval No. IR.SHMU.REC.1404.098) and was prospectively registered in the Iranian Registry of Clinical Trials (IRCT20251027067778N1). Written informed consent was obtained from all participants before enrollment. Participation was voluntary, and participants were informed of their right to withdraw from the study at any time without affecting the routine care they received. All study procedures were conducted in accordance with the ethical principles of the Declaration of Helsinki.

Availability of Data and Materials

The datasets generated and/or analyzed during the current study are not publicly available because they contain potentially identifiable participant information and ethical restrictions apply. The datasets are available from the corresponding author on reasonable request.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contributions

NH (Najmeh Hosseini): Conceptualization, Methodology, Investigation, Intervention delivery, Data curation, Formal analysis, Visualization, Writing – original draft.

NM (Nahid Maleki): Conceptualization, Methodology, Supervision, Validation, Writing – review & editing.

MT (Mahboubeh Taher): Methodology, Validation, Supervision of the psychological intervention, Writing – review & editing.

ST (Solmaz Talebi): Formal analysis, Methodology, Validation, Writing – review & editing.

All authors read and approved the final manuscript.

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References:

- 6.Sayehmiri K, Ebtekar F, Zarei M, Gheshlagh RG. Prevalence of unwanted pregnancy among Iranian women: an updated meta-analysis. *BMC Pregnancy and Childbirth*. 2019;19(1):491
- 9.Pakseresht S, Rasekh P, Leili EK. Physical health and maternal-fetal attachment among women: Planned versus unplanned pregnancy. *International Journal of Womens Health and Reproduction Sciences*. 2018;6(3):335-41
- 10.Esfahani P, Danshi Kohani Z, Arefi M. Prevalence of Unwanted Pregnancy among Iranian Women: Systematic Review and Meta - analysis. *Pajouhan Scientific Journal*. 2020;18(2):1-12. 10.52547/psj.18.2.1
- 12.Islam N, Mahmood S, Kabir H, Chowdhury SR, Elshaikh U, Alhussaini N, et al. Prevalence of unintended pregnancy in the MENA region: a systematic review and meta-analysis. *BMJ Open*. 2025;15(4):e084016. 10.1136/bmjopen-2024-084016
- 13.Bearak J, Popinchalk A, Ganatra B, Moller A-B, Tunçalp Ö, Beavin C, et al. Unintended pregnancy and abortion by income, region, and the legal status of abortion: estimates from a comprehensive model for 1990–2019. *The Lancet Global Health*. 2020;8(9):e1152-e61. [https://doi.org/10.1016/S2214-109X\(20\)30315-6](https://doi.org/10.1016/S2214-109X(20)30315-6)
- 18.Mokaberian M, Dehghanpouri H. Comparison of psychological characteristics and parental-fetal attachment in wanted and unwanted pregnancies in women's clinics in Semnan City, Iran, in 2020–2021. *J Health Res*. 2023;19(3):233-40

- 22.Kaydırak M, Yılmaz B, Demir A, Oskay Ü. The relationships between prenatal attachment, maternal anxiety, and postpartum depression: A longitudinal study. *Perspectives in Psychiatric care*. 2022;58(2):715-23
- 23.Kharaghani R, Yazdan parast E, Arasteh A. EVALUATION OF THE QUALITY OF MARITAL RELATIONSHIP AND ITS RELATIONSHIP WITH MATERNAL-FETAL ATTACHMENT IN WANTED AND UNWANTED PREGNANCIES. *Nursing and Midwifery Journal*. 2021;19(8):621-32. 10.52547/unmf.19.8.621
- 28.Coté JJ, Dilsaver DB, Dimmock J, Doehrman P, Teague S, Coté RD, et al. Prenatal attachment interventions: a comprehensive systematic review and meta-analysis. *Archives of Women's Mental Health*. 2025. 10.1007/s00737-025-01630-w
- 29.Wang X, Xu H, Liu X, Yan J, Chen C, Li Y. Evaluating the effect of psychoeducational interventions on prenatal attachment and anxiety/depression in pregnant women and partners: A systematic review and meta-analysis. *Journal of Affective Disorders*. 2023;342:33-44. <https://doi.org/10.1016/j.jad.2023.08.131>
- 30.Waters CS, Annear B, Flockhart G, Jones I, Simmonds JR, Smith S, et al. Acceptance and Commitment Therapy for perinatal mood and anxiety disorders: A feasibility and proof of concept study. *Br J Clin Psychol*. 2020;59(4):461-79. 10.1111/bjc.12261
- 31.Grunberg VA, Geller PA, Durham K, Bonacquisti A, Barkin JL. Motherhood and Me (Mom-Me): The Development of an Acceptance-Based Group for Women with Postpartum Mood and Anxiety Symptoms. *J Clin Med*. 2022;11(9). 10.3390/jcm11092345

32. Ruiz FJ. A review of Acceptance and Commitment Therapy (ACT) empirical evidence: Correlational, experimental psychopathology, component and outcome studies. *International Journal of Psychology and Psychological Therapy*. 2010;10(1):125-62
42. Hawkins SS. Telehealth in the Prenatal and Postpartum Periods. *J Obstet Gynecol Neonatal Nurs*. 2023;52(4):264-75. 10.1016/j.jogn.2023.05.113
43. Stentzel U, Grabe HJ, Schmidt S, Tomczyk S, van den Berg N, Beyer A. Mental health-related telemedicine interventions for pregnant women and new mothers: a systematic literature review. *BMC Psychiatry*. 2023;23(1):292. 10.1186/s12888-023-04790-0
44. Anyanwu IS, Jenkins J. Effectiveness of digital health interventions for perinatal depression: a systematic review and meta-analysis. *Oxf Open Digit Health*. 2024;2:oqae026. 10.1093/oodh/oqae026
45. Thompson EM, Destree L, Albertella L, Fontenelle LF. Internet-Based Acceptance and Commitment Therapy: A Transdiagnostic Systematic Review and Meta-Analysis for Mental Health Outcomes. *Behav Ther*. 2021;52(2):492-507. 10.1016/j.beth.2020.07.002
46. Han A, Kim TH. The Effects of Internet-Based Acceptance and Commitment Therapy on Process Measures: Systematic Review and Meta-analysis. *J Med Internet Res*. 2022;24(8):e39182. 10.2196/39182
47. Sasaki N, Imamura K, Nishi D, Watanabe K, Asaoka H, Sekiya Y, et al. The effect of internet-based acceptance and commitment therapy (iACT) on psychological well-being among working women with a pre-school child: A randomized controlled trial. *Journal of Contextual Behavioral Science*. 2023;28:33-47

48. Rizzi S, Nicoletti AE, De Luca C, Poggianella S, Dalmonego C, Paoli C, et al. Prevention of Postpartum Depression via a Digital Acceptance and Commitment Therapy-Based Intervention: Protocol for a Pilot Usability Study. *Frontiers in Psychiatry*. 2025;16:1633229
52. Cranley MS. Development of a tool for the measurement of maternal attachment during pregnancy. *Nurs Res*. 1981;30(5):281-4
55. Hayes SC, Luoma JB, Bond FW, Masuda A, Lillis J. Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour research and therapy*. 2006;44(1):1-25
56. Levin ME, Krafft J, Twohig MP. An overview of research on acceptance and commitment therapy. *Psychiatric Clinics*. 2024;47(2):419-31
57. Jiang X, Sun J, Song R, Wang Y, Li J, Shi R. Acceptance and commitment therapy reduces psychological distress in patients with cancer: a systematic review and meta-analysis of randomized controlled trials. *Frontiers in Psychology*. 2024;14(1):1253266
61. D'Angelo DV, Gilbert BC, RoCHAT RW, Santelli JS, Herold JM. Differences between mistimed and unwanted pregnancies among women who have live births. *Perspect Sex Reprod Health*. 2004;36(5):192-7. 10.1363/psrh.36.192.04
62. Bearak J, Popinchalk A, Alkema L, Sedgh G. Global, regional, and subregional trends in unintended pregnancy and its outcomes from 1990 to 2014: estimates from a Bayesian hierarchical model. *Lancet Glob Health*. 2018;6(4):e380-e9. 10.1016/s2214-109x(18)30029-9
63. Sedgh G, Bearak JM. Unintended pregnancy and gender inequality worldwide: an ecological analysis. *BMJ Global Health*. 2025;10(3):e016573. 10.1136/bmjgh-2024-016573

- 65.Mahmoudiani S, abedi M. Relationship between unintended pregnancy and induced abortion. Payesh (Health Monitor) Journal. 2022;21(6):627-35. 10.52547/payesh.21.6.627
- 66.McNamara J, Townsend ML, Herbert JS. A systemic review of maternal wellbeing and its relationship with maternal fetal attachment and early postpartum bonding. PloS one. 2019;14(7):e0220032
- 71.Salisbury A, Law K, LaGasse L, Lester B. Maternal-Fetal Attachment. JAMA. 2003;289(13):1701-. 10.1001/jama.289.13.1701
- 72.da Rosa KM, Scholl CC, Ferreira LA, Trettim JP, da Cunha GK, Rubin BB, et al. Maternal-fetal attachment and perceived parental bonds of pregnant women. Early human development. 2021;154:105310
- 74.Fonagy P, Steele H, Steele M. Maternal representations of attachment during pregnancy predict the organization of infant-mother attachment at one year of age. Child development. 1991;62(5):891-905
- 76.Nasab ZG, Motaghi Z, Nazari AM, Keramat A, Hadizadeh-Talasaz F. The effect of cognitive-behavioral counseling on maternal-fetal attachment among pregnant women with unwanted pregnancy in Iran: A randomized clinical Trial. Journal of Preventive Medicine and Hygiene. 2023;64(3):E316
- 77.Hasanzadeh F, Jafari SZ, Akbarzadeh M, Hosseini F, Yazdanpanahi Z. The effect of maternal–fetal attachments skills training among unintended primigravida women: a randomized controlled trial. BMC Pregnancy and Childbirth. 2025;25(1):220. 10.1186/s12884-025-07329-1

- 78.Shreffler KM, Spierling TN, Jespersen JE, Tiemeyer S. Pregnancy intendedness, maternal-fetal bonding, and postnatal maternal-infant bonding. *Infant Ment Health J.* 2021;42(3):362-73. 10.1002/imhj.21919
- 80.Bonacquisti A, Cohen MJ, Schiller CE. Acceptance and commitment therapy for perinatal mood and anxiety disorders: development of an inpatient group intervention. *Arch Womens Ment Health.* 2017;20(5):645-54. 10.1007/s00737-017-0735-8
- 81.Anusuya P, Gayatridevi S. Acceptance and Commitment Therapy and Psychological Well-Being: A Narrative Review. *Cureus.* 2025;17(1):e77705. 10.7759/cureus.77705
- 82.Howard S, Houghton CMG, White R, Fallon V, Slade P. The feasibility and acceptability of a single-session Acceptance and Commitment Therapy (ACT) intervention to support women self-reporting fear of childbirth in a first pregnancy. *Psychology & health.* 2023;38(11):1460-81
- 83.Aghili M, Gholami N, Babaee E. The effectiveness of acceptance and commitment therapy on pregnancy anxiety and physiological parameters of newborns. *Journal of Sabzevar University of Medical Sciences.* 2023;30(5):646-55
- 84.Koc E, Baltaci N, Bal S. Does telecounseling reduce anxiety and depression during pregnancy? A randomized controlled trial. *Rev Assoc Med Bras (1992).* 2023;69(6):e20221213. 10.1590/1806-9282. 20221213
- 85.Shahrokhi S, Basirat Z, Barat S, Kheirkhah F, Adib-Rad H, Mirtabar SM, et al. Barriers and Advantages of Internet-based Psychotherapy in the Treatment of Depression in Iranian Pregnant Women: A Qualitative Study. *Iran J Nurs Midwifery Res.* 2025;30(4):510-6 10.4103/ijnmr.ijnmr_345_23

- 86.Li L, Yue SW, Xu J, Qiao J, Redding SR, Ouyang YQ. Effectiveness of Internet-based psychological interventions for treating perinatal depression: A systematic review and meta-analysis. *J Clin Nurs*. 2023;32(13-14):3087-101. 10.1111/jocn.16399
- 88.Simon N, Cunningham E, Samuel V, Waters C. Videoconference-delivered group acceptance commitment therapy for perinatal mood and anxiety disorders: facilitators views and recommendations. *J Reprod Infant Psychol*. 2024;42(4):700-14 10.1080/02646838.2023.2180143
- 89.Alves SP, Costa T, Ribeiro I, Néné M, Sequeira C. Perinatal mental health counselling programme: A scoping review. *Patient education and counseling*. 2023;106:170-9
- 90.Davoudi M, Pouladi Rishehri A, Danesh E. Effectiveness of acceptance and commitment therapy on pregnancy Concerns, stress coping Schemas, and interpersonal sensitivity in pregnant women with pregnancy anxiety. *Appl Family Therapy J*. 2024;5(4):74-85
- 92.Cheraghian H, Heidari N, Ghedami S, Zarei B. Efficacy of Acceptance and Commitment Therapy on Depressed Pregnant Women. *Community Health Journal*. 2017;9(2):56-64.
- 96.Lima CdA, Brito MFSF, Pinho Ld, Ruas SJS, Messias RB, Silveira MF. Maternal-fetal attachment and interrelated factors in pregnant women assisted in Primary Health Care. *Revista Latino-Americana de Enfermagem*. 2024;32:e4404
- 105.Jangjoo S, Lotfi R, Assareh M, Kabir K. Effect of counselling on maternal-fetal attachment in unwanted pregnancy: a randomised controlled trial. *J Reprod Infant Psychol*. 2021;39(3):225-235
106. Yazdanimehr R, Omid A, Akbari H, Sadat Z. Effects of a mindfulness-based childbirth and

parenting program on maternal-fetal attachment: a randomized controlled trial among Iranian pregnant women. *Complementary Therapies in Clinical Practice*. 2020;41:101226