Effects of Perinatal Paternal Involvement in Breastfeeding Support on Maternal Self-Efficacy and Coparenting Outcomes

February 25, 2026

1. Study Design and Setting

This study was designed as a non-randomized parallel controlled trial conducted at a tertiary maternity hospital in Shaanxi Province, China. Pregnant women and their partners who attended antenatal care or delivered at the study hospital between August 20 and October 20, 2025 were consecutively recruited.

The intervention period covered the entire perinatal continuum, extending from 14 weeks of gestation to 24 weeks postpartum, in alignment with the structured intervention framework illustrated in **Figure 1.**

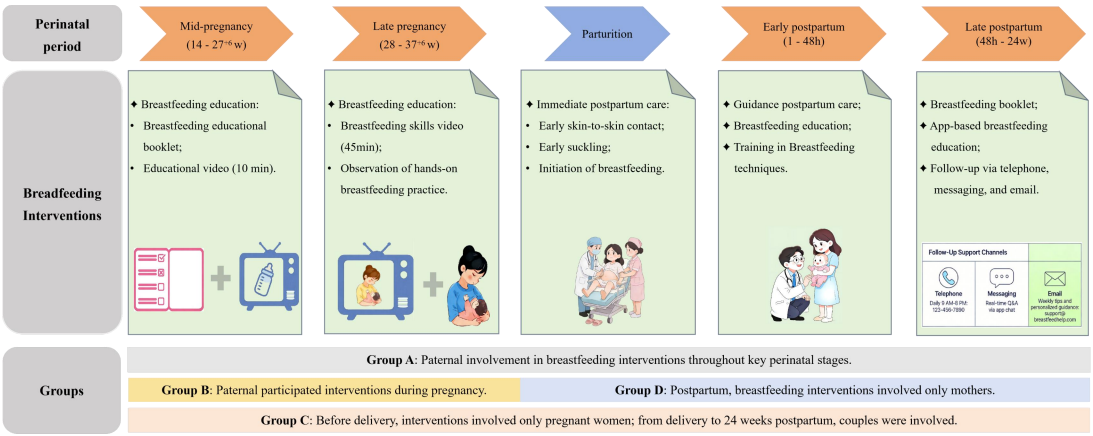

Figure1. Schematic Diagram of the Study Design and Participant Grouping.

2. Participants

2.1 Inclusion Criteria

Participants were eligible for inclusion if they met all of the following criteria:

- Married couples, with gestational age between 12 - 14 weeks at enrollment for Groups A and B;
- Planned discharge within 48 hours after delivery;
- Mothers and partners expected to cohabit for ≥6 months postpartum;
- Gestational age at delivery ≥37 weeks;
- No diagnosed psychiatric disorders in either partner;

- Voluntary participation with written informed consent from both mother and partner;
- Neonates with Apgar scores ≥8 at 1, 5, and 10 minutes after birth.

2.2 Exclusion Criteria

- Maternal diagnosis of infectious diseases (e.g., HIV, hepatitis B);
- Withdrawal from the study at any stage;
- Failure to complete required questionnaires;
- Loss to follow-up during the study period;
- Concurrent participation in other interventional studies;
- Major fetal anomalies.

3. Group Allocation and Intervention Characteristics

Participants were assigned to one of four groups according to the timing and extent of paternal involvement in breastfeeding interventions, as illustrated in **Figure 1**.

Group A: Antenatal–Postpartum Paternal Involvement Group

Both mothers and their partners participated jointly in breastfeeding interventions throughout all key perinatal stages, from 14 weeks of gestation to 24 weeks postpartum.

Interventions comprised:

- Antenatal breastfeeding education during mid-pregnancy (14–27^{+6} weeks) and late pregnancy (28–37^{+6} weeks);
- Implementation of the "three early practices" during parturition (early skin-to-skin contact, early suckling, and early initiation of breastfeeding);
- Structured breastfeeding guidance and skills training provided to both mothers and partners during the early postpartum period (1–48 hours);

- Continued breastfeeding support during the late postpartum period (48 hours to 24 weeks postpartum), including educational materials, digital resources, and scheduled follow-up for both partners.

Group B: Antenatal Paternal Involvement Group

Both mothers and their partners jointly participated in breastfeeding interventions during pregnancy only, from 14 weeks of gestation until delivery.

Interventions included:

- Antenatal breastfeeding education during mid- and late pregnancy;
- Implementation of the “three early practices” during parturition.
- Postpartum breastfeeding support was provided only to mothers, without mandatory partner involvement.

Group C: Postpartum Paternal Involvement Group

- Breastfeeding interventions before delivery were provided exclusively to pregnant women.
- During pregnancy, mothers received antenatal breastfeeding education without partner participation;
- During parturition, the “three early practices” were implemented;
- From delivery through 24 weeks postpartum, both mothers and their partners jointly participated in breastfeeding interventions identical to the postpartum components of Group A.

Group D:

- Mothers did not receive antenatal breastfeeding education at the study hospital.
- During parturition, the “three early practices” were implemented;
- From delivery through 24 weeks postpartum, mothers received routine breastfeeding guidance consistent with standard clinical care;

- Partner participation in breastfeeding interventions was not required.

4. Intervention Procedures

4.1 Antenatal Interventions

4.1.1 Mid-Pregnancy (14–27^{+6} weeks)

Mothers and their partners in Groups A and B received breastfeeding educational booklets and jointly viewed a 10-minute educational video, aiming to establish foundational breastfeeding knowledge and foster positive breastfeeding attitudes.

4.1.2 Late Pregnancy (28–37^{+6} weeks)

Mothers and partners in Groups A and B jointly viewed a 45-minute breastfeeding skills video, which covered breastfeeding positions, latch techniques, milk expression methods, and precautionary measures. Completion of the session was confirmed by investigators and recorded in the Maternal and Child Health Handbook.

4.2 Intrapartum Intervention

All participants received standardized intrapartum breastfeeding support in accordance with the hospital's Perinatal Breastfeeding Clinical Pathway, including implementation of the "three early practices" (early skin-to-skin contact, early suckling, and early initiation of breastfeeding) immediately after birth.

4.3 Early Postpartum Interventions (1–48 hours)

At 6, 24, and 48 hours postpartum: in Groups A and C, breastfeeding education and practical skills training were provided to both mothers and their partners; in Groups B and D, the same interventions were provided only to mothers, without mandatory partner involvement.

4.4 Late Postpartum Interventions (48 hours to 24 weeks)

A Breastfeeding Activity Record Handbook, developed based on Jennifer's theoretical framework, was used to document breastfeeding goals, partner support, maternal and infant characteristics, and partner involvement in maternal and infant

care. Mothers completed the handbook on a weekly basis.

Educational QR codes provided access to breastfeeding knowledge, practical skills training, and frequently asked questions. Weekly telephone to assess breastfeeding practices, infant growth, and breastfeeding-related challenges. A moderated WeChat support group, providing professional consultation, peer interaction, and emotional support.

5. Indicator Definitions

Exclusive breastfeeding was defined as the provision of only breast milk to the infant, with no additional liquids or solid foods, except for prescribed vitamins, minerals, or medications, excluding water. Pregnancy complications included gestational diabetes mellitus, gestational hypertension, hypothyroidism, hyperthyroidism, placenta previa, and intrahepatic cholestasis of pregnancy.

6. Outcome Measures

The primary outcomes were maternal breastfeeding self-efficacy, spousal participation frequency, co–parenting perception, and feeding type (exclusive, mixed, or formula) at 6, 12, and 24 weeks postpartum.

Breastfeeding self-efficacy was measured using the Breastfeeding Self-Efficacy Scale–Short Form (BSES-SF) developed by Dennis. The scale contains 14 items rated on a 5-point Likert scale (score range, 14–70); higher scores indicate stronger self-efficacy (Cronbach's $\alpha = 0.93$). Co-parenting perception was assessed with the Brief Co-parenting Relationship Scale (Brief-CRS), developed by Feinberg et al.. The scale includes five domains–mutual support, affirmation, conflict, undermining, and division of labor–with 14 items rated on a 7-point scale (0–6); higher total scores indicate stronger co-parenting perception.

7. Quality Control

Obstetric nurses with continuous involvement in the study served as investigators. After each outpatient session, they documented the participation of pregnant women

and their partners in breastfeeding activities. Departmental supervisors were trained under the Breastfeeding Clinical Pathway to ensure uniformity in breastfeeding education. Trained nurses delivered stage-specific interventions and conducted follow-up assessments. During data collection, investigators maintained objectivity, avoided leading questions, and adhered strictly to the survey protocol. Questionnaires were reviewed for completeness and accuracy, and any errors or omissions were corrected immediately. Data were entered using a double-entry system to minimize transcription errors and ensure data integrity.

8. Statistical Analysis

All statistical analyses were performed with SPSS software, version 22.0 (IBM Corp., Armonk, NY), and data were entered and verified using Epidata version 3.0. A two-sided $P \leq 0.05$ was considered statistically significant. Assuming a national exclusive breastfeeding rate of 30% and a projected 50% rate in the intervention groups, 93 participants per group were needed for 80% power ($\alpha = 0.05$). Allowing for 15% attrition, the required sample was 107 per group (428 total). A total of 526 women were enrolled, and 481 completed the study (Group A, 133; Group B, 115; Group C, 116; Group D, 117).

Each item was coded based on the frequency of participation during the past week: 0 = no participation; 1 = occasional (1–2 times per week); 2 = frequent (3–5 times per week). Continuous variables were tested for normality using the Kolmogorov–Smirnov test. Normally distributed data were summarized as means with standard deviations, whereas non-normally distributed data were expressed as medians with interquartile ranges. Categorical variables were described as frequencies and percentages.

Comparisons between groups were performed using independent-sample t tests or one-way analysis of variance (ANOVA) for continuous variables, with post hoc pairwise comparisons when appropriate. Categorical variables were analyzed using chi-square or Fisher’s exact tests, and ordinal or non-normally distributed data were

analyzed using nonparametric tests, including the Mann–Whitney U test or Kruskal–Wallis test.

Changes in repeated measures over time, such as breastfeeding self-efficacy and co-parenting scores at 6, 12, and 24 weeks postpartum, were assessed using generalized linear models (GLMs). These models allowed for the evaluation of main effects of group and time as well as group–time interactions, while adjusting for potential confounding variables. Analyses were conducted on available data, and sensitivity analyses were performed to assess the robustness of the findings.