Impact of Birth Preparation on Maternal Outcomes

Research shows that birth preparation classes can reduce cesarean section rates, postpartum depression scores, and time to breastfeeding initiation, although some studies found neutral results.

Abstract

Birth preparation classes influence maternal endpoints in specific, measurable ways. Eight-session programs reported significant reductions in cesarean section rates ($p = 0.023$ and $p = 0.044$), although one cohort study noted similar rates between groups (26.09% versus 26.83%), and another observed more frequent normal vaginal deliveries among participants. Several studies using the Edinburgh Postnatal Depression Scale found that regular class attendance corresponded to lower postpartum depression scores ($p < 0.001$ and $p < 0.05$), with one additional report noting reduced depression rates. In terms of breastfeeding, one study found that a targeted course shortened the interval to initiation from 17.8 to 6.2 hours (p 0.01) while another documented an increase in exclusive breastfeeding rates from 78% to 95%; a separate investigation reported no measurable difference. These findings suggest that comprehensive, multi-session birth preparation classes can positively affect mode of delivery, maternal mood, and early breastfeeding practices, with specific outcomes varying by intervention format and participant characteristics.

Paper search

Using your research question "How do birth preparation classes and information sharing affect specific maternal outcomes such as rates of cesarean section, postpartum depression, and breastfeeding initiation?", we searched across over 126 million academic papers from the Semantic Scholar corpus. We retrieved the 50 papers most relevant to the query.

Screening

We screened in papers that met these criteria:

- **Population**: Does the study include pregnant women or new mothers (up to 12 months postpartum) as the primary participants?
- **Intervention Type**: Does the study evaluate structured birth preparation classes or educational interventions that provide information about pregnancy, childbirth, or early postpartum period?
- **Outcomes**: Does the study measure at least one of the following outcomes: cesarean section rates, postpartum depression scores/diagnosis, or breastfeeding initiation rates?
- **Study Design**: Does the study include a comparison group (either as an RCT or observational cohort study with control group)?
- **Intervention Timing**: Does the intervention include a prenatal preparation component?
- **Intervention Description**: Does the study provide a clear description of the educational intervention components and delivery?
- **Population Risk Status**: Does the study include the general population of pregnant women (not exclusively high-risk pregnancies)?
- **Intervention Isolation**: Can the effects of the birth preparation component be isolated from other intervention components in the study?

We considered all screening questions together and made a holistic judgement about whether to screen in each paper.

Data extraction

We asked a large language model to extract each data column below from each paper. We gave the model the extraction instructions shown below for each column.

- **Study Design**:

  Identify the specific type of study design used. Look in the methods section for clear description. Possible designs include:

- Randomized controlled trial
- Cohort study
- Cross-sectional study
- Prospective or retrospective study

If multiple design elements are present, list all. If design is unclear, note "design not clearly specified".

Specific attention to whether this is an intervention study comparing birth preparation classes to no classes, or an observational study examining associations.

- **Participant Characteristics**:

  Extract the following details about study participants:

- Total sample size
- Demographic characteristics (age range, mean age)
- Pregnancy characteristics (nulliparous vs multiparous, gestational age)
- Inclusion/exclusion criteria

If ranges or means are provided, record both. If percentages are given for categorical variables, convert to absolute numbers where possible.

If participant details are incomplete, note "insufficient information" for specific missing details.

- **Birth Preparation Class Details**:

  Describe the specific characteristics of birth preparation classes:

- Duration of classes
- Number of sessions
- Content covered
- Who delivered the classes (e.g., midwives, nurses, trained educators)
- Setting of classes (hospital, community center, online)

If multiple details are not specified, note which specific details are missing. If no details are provided about class content or structure, write "intervention details not specified".

- **Outcome Measures**:

  List all outcomes directly related to the research question:

- Cesarean section rates
- Postpartum depression scores
- Breastfeeding initiation rates

For each outcome:

- Specify the measurement tool used (e.g., EPDS for depression)
- Record the specific time point of measurement
- Extract the numerical results with statistical significance if reported

If an outcome is mentioned but not fully reported, note "outcome incompletely reported".

- **Study Setting and Context**:

  Extract information about:

- Geographic location of the study
- Healthcare system context
- Time period of data collection

If any of these details are missing, specifically note which are not provided. Ensure the context is clear enough to understand potential generalizability of results.

Results

Characteristics of Included Studies

Study	Study Design	Sample Size	Intervention Type	Outcomes Measured	Full text retrieved
Aghdam et al., "Effect of prenatal preparation classes"	Randomized controlled trial	100	Eight 2-hour prenatal preparation classes	Cesarean section rates, labor duration	No
Hassanzadeh et al., 2020	Cohort study	204	Childbirth preparation classes (1-8 sessions)	Childbirth experience, postpartum depression	No
Hatamleh et al., 2019	Randomized controlled trial	133	Childbirth preparation course	Breastfeeding initiation, labor onset, cervical dilation	No
Hughes-Bass et al., 2020	Systematic review	Various (200 to 14,630)	Birth preparation classes	Cesarean section rates	No
Mehdizadeh et al., 2005	Randomized controlled trial	200	Eight birth preparation classes	Cesarean section rates	Yes
Mueller et al., 2020	Cohort study	197	Childbirth education classes (4-night, 5-night, or 1-day)	Cesarean section rates, breastfeeding initiation	Yes

Study	Study Design	Sample Size	Intervention Type	Outcomes Measured	Full text retrieved
Naeeni and Simbar, 2018	Systematic review	No mention found	Child birth preparation classes	Postpartum depression, normal vaginal delivery rates	Yes
Ricchi et al., 2020	Prospective cohort study	147	Eight childbirth education classes	Cesarean section rates, epidural analgesia requests	Yes
Stoll and Hall, 2012	Observational study	624	Childbirth education classes	Cesarean section rates, breastfeeding initiation	Yes
Tosun and Bulut, 2021	Cross-sectional cohort study	89	4-week birth education program	Postpartum depression scores	Yes

- Study Design: We found 3 randomized controlled trials, 4 cohort studies (including one cross-sectional), 2 systematic reviews, and 1 observational study.
- Sample Size:
  - 5 studies had between 100-200 participants
  - 1 study had 201-300 participants
  - 1 study had over 600 participants
  - 1 study had fewer than 100 participants
  - 1 systematic review had varied sample sizes
  - We didn't find sample size information for 1 study
- Intervention: All 10 studies reported using some form of prenatal or childbirth education classes as the intervention, though the specific format and duration varied.
- Outcomes: The most commonly measured outcomes were:
  - Cesarean section rates (6 studies)
  - Postpartum depression (3 studies)
  - Breastfeeding initiation (3 studies)

  Other outcomes measured in individual studies included labor duration, childbirth experience, labor onset, cervical dilation, vaginal delivery rates, and epidural analgesia requests.

Effects of Birth Preparation on Maternal Outcomes

Cesarean Section Rates

Study	Intervention Details	Control Group Rate	Intervention Group Rate	Key Findings
Aghdam et al., "Effect of prenatal preparation classes"	Eight 2-hour prenatal preparation classes	No mention found	No mention found	Significant reduction in cesarean section rates (P=0.023)
Hassanzadeh et al., 2020	Childbirth preparation classes (1-8 sessions)	No mention found	No mention found	No mention found
Hatamleh et al., 2019	Childbirth preparation course	No mention found	No mention found	No mention found
Hughes-Bass et al., 2020	Various birth preparation classes	Various	Various	Mixed results across studies
Mehdizadeh et al., 2005	Eight birth preparation classes	No mention found	No mention found	Significant reduction in cesarean section rates (p = 0.044)
Mueller et al., 2020	Childbirth education classes (4-night, 5-night, or 1-day)	26.83%	26.09%	No significant difference in cesarean rates
Naeeni and Simbar, 2018	Child birth preparation classes	44.12%	18.54%	Higher normal vaginal delivery rates in intervention group
Ricchi et al., 2020	Eight childbirth education classes	No mention found	No mention found	No significant difference in cesarean rates (Odds Ratio (OR) = 0.8, 95% Confidence Interval (CI) = 0.3-1.7, p=0.503)
Stoll and Hall, 2012	Childbirth education classes	No mention found	No mention found	Fewer cesarean surgeries among class attendees
Tosun and Bulut, 2021	4-week birth education program	No mention found	No mention found	No mention found

- Regarding outcomes:
  - 3 studies reported reduced cesarean rates
  - 2 studies reported no significant difference in cesarean rates
  - 1 study reported increased vaginal delivery rates
  - 1 study reported mixed results
  - We didn't find outcome information in the available full texts or abstracts for 3 studies

- Regarding statistical significance:
  - 2 studies reported $p < 0.05$
  - 1 study reported $p > 0.05$
  - We didn't find significance information in the available full texts or abstracts for 7 studies
- We found control and intervention group rates for 2 studies:
  - One study reported rates of 26.83% (control) and 26.09% (intervention)
  - Another reported rates of 44.12% (control) and 18.54% (intervention)
- The interventions varied in duration and format, ranging from 4-week programs to 8-session classes, and including 1-day, 4-night, and 5-night options.

Postpartum Depression

Study	Intervention Details	Measurement Tool	Control Group Score	Intervention Group Score	Key Findings
Aghdam et al., "Effect of prenatal preparation classes"	Eight 2-hour prenatal preparation classes	No mention found	No mention found	No mention found	No mention found
Hassanzadeh et al., 2020	Childbirth preparation classes (1-8 sessions)	Edinburgh Postnatal Depression Scale (EPDS)	No mention found	No mention found	Regular attenders had significantly lower scores compared to non-attenders ($p < .001$)
Hatamleh et al., 2019	Childbirth preparation course	No mention found	No mention found	No mention found	No mention found
Hughes-Bass et al., 2020	Various birth preparation classes	No mention found	No mention found	No mention found	No mention found
Mehdizadeh et al., 2005	Eight birth preparation classes	No mention found	No mention found	No mention found	No mention found
Mueller et al., 2020	Childbirth education classes (4-night, 5-night, or 1-day)	No mention found	No mention found	No mention found	No mention found

Study	Intervention Details	Measurement Tool	Control Group Score	Intervention Group Score	Key Findings
Naeeni and Simbar, 2018	Child birth preparation classes	No mention found	No mention found	No mention found	Lower postpartum depression rates in intervention group
Ricchi et al., 2020	Eight childbirth education classes	No mention found	No mention found	No mention found	No mention found
Stoll and Hall, 2012	Childbirth education classes	No mention found	No mention found	No mention found	No mention found
Tosun and Bulut, 2021	4-week birth education program	Edinburgh Postpartum Depression Scale (EPDS)	9.70 ± 8.3	6.57 ± 7.2	Significantly lower scores for class attendees ($p<0.05$)

- For measurement tools:
  - The Edinburgh Postnatal/Postpartum Depression Scale (EPDS) was used in 2 studies.
  - We didn't find information on measurement tools in the available full texts or abstracts for 8 studies.
- Regarding key findings:
  - 3 studies reported lower depression scores or rates in the intervention group.
  - We didn't find reported key findings in the available full texts or abstracts for 7 studies.
- Of the 3 studies reporting outcomes:
  - 2 studies used the EPDS and found significantly lower scores in the intervention group ($p<0.05$ and $p<0.001$).
  - 1 study reported lower postpartum depression rates in the intervention group but didn't specify the measurement tool or provide statistical significance.
- We didn't find any studies reporting no effect or negative effects of the interventions on postpartum depression.

Breastfeeding Initiation

Study	Intervention Details	Measurement Tool	Control Group Rate	Intervention Group Rate	Key Findings
Aghdam et al., "Effect of prenatal preparation classes"	Eight 2-hour prenatal preparation classes	No mention found	No mention found	No mention found	No mention found
Hassanzadeh et al., 2020	Childbirth preparation classes (1-8 sessions)	No mention found	No mention found	No mention found	No mention found
Hatamleh et al., 2019	Childbirth preparation course	Time to initiation	Mean = 17.8 hours	Mean = 6.2 hours	Earlier initiation in intervention group (p .01)
Hughes-Bass et al., 2020	Various birth preparation classes	No mention found	No mention found	No mention found	No mention found
Mehdizadeh et al., 2005	Eight birth preparation classes	No mention found	No mention found	No mention found	No mention found
Mueller et al., 2020	Childbirth education classes (4-night, 5-night, or 1-day)	Exclusive breastfeeding rate	78%	95%	Higher exclusive breastfeeding rates in intervention group
Naeeni and Simbar, 2018	Child birth preparation classes	No mention found	No mention found	No mention found	No mention found
Ricchi et al., 2020	Eight childbirth education classes	No mention found	No mention found	No mention found	No mention found
Stoll and Hall, 2012	Childbirth education classes	No mention found	No mention found	No mention found	No significant difference in breastfeeding initiation
Tosun and Bulut, 2021	4-week birth education program	No mention found	No mention found	No mention found	No mention found

- We found specific measurement tools in 2 out of 10 studies:
  - 1 study measured time to initiation of breastfeeding
  - 1 study measured exclusive breastfeeding rate

  - We didn't find information on measurement tools in the available full texts or abstracts for the other 8 studies

- We found control and intervention group rates for 2 out of 10 studies. We didn't find this information for the other 8 studies.
- We found key findings reported in 3 out of 10 studies:
  - 1 study reported earlier initiation of breastfeeding in the intervention group (p .01)
  - 1 study reported higher exclusive breastfeeding rates in the intervention group
  - 1 study reported no significant difference in breastfeeding initiation
  - We didn't find key findings in the available full texts or abstracts for the other 7 studies
- Regarding statistical significance:
  - 1 study reported p .01
  - 1 study reported no significant difference
  - We didn't find information on statistical significance in the available full texts or abstracts for the other 8 studies

Intervention Characteristics and Outcome Relationships

The studies included in this review featured a range of birth preparation class formats:

- Single-day intensive courses to multiple sessions over several weeks
- Mueller et al. offered classes in 4-night, 5-night, and 1-day formats
- Aghdam et al. and Mehdizadeh et al. both implemented eight-session programs

Content varied across interventions:

- Some focused on specific aspects like pain management and breathing techniques
- Others covered a broader range of topics including postpartum care and breastfeeding

Patterns in relation to outcomes:

1. Cesarean Section Rates:
   - Studies with more intensive interventions (e.g., eight sessions) tended to report significant reductions
   - Not consistent across all studies (e.g., Ricchi et al. found no significant difference despite using an eight-session format)
2. Postpartum Depression:
   - Both studies reporting significant reductions involved multiple-session interventions
   - Suggests more comprehensive programs may be more effective for maternal mental health outcomes
3. Breastfeeding:
   - Hatamleh et al. reported earlier breastfeeding initiation with a specifically designed childbirth preparation course
   - Mueller et al.'s classes, covering a wide range of topics including breastfeeding, were associated with higher exclusive breastfeeding rates

These observations suggest that more comprehensive, multi-session birth preparation programs may be more effective in improving maternal outcomes. However, the inconsistency in reporting across studies and the variability in intervention characteristics make it difficult to draw firm conclusions about the optimal format or content of birth preparation classes.

Contextual Factors

Demographic Influences

The studies were conducted across various countries and healthcare systems:

- Iran
- Jordan
- Italy
- United States
- Canada
- Turkey

Potentially influential demographic factors:

1. Age:
    - Mehdizadeh et al.'s study included only women younger than 35 years
    - Tosun and Bulut's study had a mean age of 27.8 years
    - The potential impact of maternal age on effectiveness was not consistently reported across studies
2. Parity:
    - Many studies focused on nulliparous or primiparous women (e.g., Aghdam et al., Hatamleh et al.)
    - This focus on first-time mothers may limit generalizability to multiparous women
3. Education Level:
    - Ricchi et al. noted that women who attended birth preparation classes were more likely to have higher education levels
    - Suggests potential self-selection bias in non-randomized studies
    - Highlights the importance of considering education level as a potential confounding factor
4. Risk Status:
    - Most studies focused on low-risk pregnancies
    - Some explicitly excluded high-risk cases (e.g., Tosun and Bulut)
    - This focus on low-risk pregnancies may limit applicability to high-risk populations

These demographic factors underscore the importance of considering specific population characteristics when interpreting the effectiveness of birth preparation classes.

Implementation Considerations

Implementation of birth preparation classes varied considerably across the included studies:

1. Timing:

- Classes offered at different stages of pregnancy
- Aghdam et al.'s intervention: 20th to 37th weeks of gestation
- Tosun and Bulut's program: 2nd and 3rd trimesters
- Optimal timing remains unclear and may depend on specific outcomes targeted

2. Duration and Intensity:
    - Varied widely from single-day intensive courses to multiple sessions over several weeks
    - Mueller et al.: 4-night, 5-night courses, and 1-day overview
    - Aghdam et al. and Mehdizadeh et al.: eight-session formats
3. Content:
    - All programs focused on birth preparation, but specific content varied
    - Some included topics such as breastfeeding, postpartum care, and newborn care (e.g., Mueller et al.)
    - Others focused more narrowly on the birth process itself
4. Delivery Format:
    - Most studies described in-person group classes, often in hospital settings
    - Potential for alternative delivery formats (e.g., online classes, individual sessions) not extensively explored
5. Healthcare System Integration:
    - Degree of integration into routine antenatal care varied across studies and healthcare systems
    - Mehdizadeh et al. suggested implementing classes as part of national health policy in Iran
6. Cultural Adaptation:
    - Need for cultural adaptation evident given diverse settings
    - Few studies explicitly discussed tailoring interventions to specific cultural contexts

These implementation considerations highlight the complexity of designing and delivering effective birth preparation classes across diverse populations and healthcare settings.

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