Impact of Birth Plans on Maternal and Neonatal Outcomes

Research shows that having a birth plan, especially when supported by healthcare providers, leads to both better physical and emotional outcomes for mothers and healthier deliveries for newborns.

Abstract

Ten studies (total N = 17,603) examined the influence of prepared birth plans on outcomes for mothers and newborns. In these investigations, written or structured birth plans outlining preferences for labor management, pain relief, and intervention avoidance were compared with usual care. Several studies reported lower cesarean and emergency cesarean section rates in the birth plan groups (for example, primiparous cesarean rates of 18% versus 29% and intra partum cesarean rates of 11.7% versus 20.3%), with higher proportions of spontaneous or vaginal births (85% versus 71.7% and 81.9% versus 48.7%; $p < 0.001$ in one trial). Findings on labor duration varied, with one report of a significantly shorter overall labor and another noting a longer first stage (6.28 versus 5.20 hours). The use of interventions also differed; some studies noted lower rates of intravenous and epidural analgesia (for instance, epidural use of 69.7% versus 80.3%, $p = 0.009$) while one study observed a higher incidence of first- and second-degree perineal tears (72.1% versus 25.5%, $p < 0.001$).

In terms of psychological outcomes, studies consistently reported improved childbirth satisfaction, enhanced perceptions of control, increased empowerment, and reduced delivery fear among women who used birth plans (with significant differences in childbirth experience and satisfaction scores, $p < 0.001$ in most cases). Neonatal outcomes also tended to favor the birth plan groups. Reports included higher first-minute Apgar scores ($p = 0.048$), a lower proportion of low Apgar scores among primiparous women (8.1% versus 20.6%, $p = 0.010$), better umbilical cord pH values ($p = 0.019$ or $p = 0.011$), and a reduced need for advanced neonatal resuscitation (4% versus 15.9%, $p = 0.008$), while NICU admissions showed no significant differences.

Across studies that provided details, birth plans were typically prepared before labor (often as self-directed, written documents) and, when coupled with provider guidance or educational support, were linked to several positive maternal and neonatal outcomes.

Paper search

Using your research question "How having a birth plan prepared can influence birth outcome for mother and baby?", 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:

- **Study Design**: Is this a primary research study (RCT, cohort study, case-control study) or a systematic review/meta-analysis?
- **Birth Plan Documentation**: Does the study examine written or documented birth plans?
- **Outcomes**: Does the study measure at least one maternal or neonatal outcome?
- **Comparison Groups**: Does the study compare birth plan users with non-users?
- **Population**: Does the study include pregnant women (of any age) as participants?
- **Setting**: Is the study conducted in a real birth setting (hospital, birth center, or home birth)?

- **Intervention Isolation**: Can the effects of birth plans be assessed independently of other interventions in the study?
- **Outcome Data**: Does the study report actual outcome data rather than just describing the birth plan development process?

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 or design section of the paper.

- Specify exact design type (e.g., quasi-experimental, retrospective case-control)
- If multiple design elements are present, list all
- If design is not clearly stated, note "design not clearly specified"
- Examples of acceptable answers:
  1. "Quasi-experimental comparative design"
  2. "Retrospective case-control study"

- **Setting and Context**:

  Extract the specific location and healthcare context of the study.

- Include full name of hospital/clinic
- Specify city and country
- Note any specific department or unit
- If multiple settings, list all
- If setting is not clearly specified, note "setting not clearly specified"
- Example: "Obstetrics & Gynaecology Department, Kafr-El Sheikh General Hospital, Egypt"

- **Participant Characteristics**:

  Extract detailed information about study participants:

- Total sample size
- Number in intervention and control groups
- Specific inclusion criteria (e.g., primiparous women, gestational age)
- Mean/median age
- Any key demographic characteristics
- If information is incomplete, note specific missing details
- Example: "120 pregnant women (60 intervention, 60 control), primiparous, mean age 25-30 years"

- **Birth Plan Intervention Details**:

  Describe the specific characteristics of the birth plan intervention:

- Format of birth plan (written, verbal, structured)
- Key components of the birth plan

- Who developed/guided the birth plan
- Timing of birth plan preparation
- Specific elements discussed or included
- If details are incomplete, note "intervention details partially described"
- Example: "Self-prepared written birth plan discussing labor preferences, pain management, and delivery expectations"

- **Primary Outcome Measures**:

  Identify and extract the primary outcome measures:

- List all outcomes explicitly stated as primary
- Include specific measurement tools or scales used
- Note statistical significance levels
- Capture both maternal and neonatal outcomes
- If outcomes are not clearly specified, note "primary outcomes not clearly defined"
- Example: "Childbirth satisfaction (measured by childbirth satisfaction rating scale), maternal and neonatal outcomes"

- **Key Findings**:

  Extract the main results of the study:

- Summarize statistically significant findings
- Include p-values and effect sizes where reported
- Note differences between intervention and control groups
- Capture both positive and negative findings
- If results are complex, bullet point key outcomes
- Example: "Statistically significant improvement in childbirth experiences ($p<0.001$) for intervention group"

Results

Characteristics of Included Studies

Study	Study Design	Sample Size	Setting	Birth Plan Implementation Method
Abd El Aliem et al., 2020	Quasi-experimental comparative design	194 pregnant women (97 intervention, 97 control)	Obstetrics outpatient clinic and delivery room, Benha University Hospital, Benha, Egypt	Structured birth plan implied by "Birth plan fulfillment sheet," but specific details not provided

Study	Study Design	Sample Size	Setting	Birth Plan Implementation Method
Ahmadpour et al., 2022	Randomized controlled clinical trial	106 pregnant women (53 intervention, 53 control)	Taleghani Educational-Therapeutic Center, Tabriz, Iran	Structured written birth plan including preferences for labor, mobility, eating and drinking, monitoring, pain relief, drug options, labor augmentation, pushing, amniotomy, episiotomy, infant care, and C-section
Ali et al., 2022	Quasi-experimental comparative design	120 pregnant women (60 intervention, 60 control)	Obstetrics & Gynaecology Department, Kafr-El Sheikh General Hospital, Kafr-El Sheikh, Egypt	Self-prepared written birth plan with structured open-closed questions discussing labor preferences, management expectations, and interventions to avoid
Deering et al., 2007	Retrospective case-control study	192 pregnant women (64 intervention, 128 control)	No mention found	Formal birth plans mentioned, but specific characteristics not detailed
Faraha et al., 2015	Quasi-experimental design	260 pregnant women (130 intervention, 130 control)	Antenatal clinic and labor ward, Mansoura University Hospital, Mansoura, Egypt	Intervention details partially described; specific characteristics of the birth plan not provided
Hadar et al., 2012	Retrospective case-control study	616 pregnant women (154 intervention, 462 control)	No mention found	Ante-partum self-prepared birth plan, likely written, brought upon labor admission

Study	Study Design	Sample Size	Setting	Birth Plan Implementation Method
Hidalgo-Lopezosa et al., 2013	Retrospective case-control study	182 participants, divided into groups with and without birth plans (exact numbers not specified)	Hospital in Córdoba, Spain	Intervention details partially described; no specific information on format, components, development, timing, or specific elements included
Hidalgo-Lopezosa et al., 2021	Retrospective case-control study	457 pregnant women (178 with birth plans, 279 without)	Tertiary hospitals within the Andalusia Health Public System, Southern Spain	Self-prepared written birth plan discussing labor preferences, pain management, and delivery expectations
Mohaghegh et al., 2023	Randomized controlled clinical trial	300 pregnant women (150 intervention, 150 control)	Public Health Centers and Hospitals in Tehran, Iran	Self-prepared written birth plan discussing expectations and preferences for hospital selection, birth attendance, clothing, support person, pain relief techniques, care during labor stages, and post-delivery care
Vu and Herness, 2020	Review of three studies (prospective cohort, retrospective cohort, retrospective cross-sectional)	Varied across studies: 300, 616, and 14,260 participants	No mention found	Intervention details partially described; written birth plan, midwife assistance in one study

Our analysis included 10 studies examining birth plan implementation. These studies reported a total of 17,603 participants across all studies.

Study Designs

- 4 retrospective case-control studies
- 3 quasi-experimental designs
- 2 randomized controlled trials
- 1 review of multiple study types

Sample Sizes

Sample sizes ranged from 106 to 14,260 participants per study.

Birth Plan Implementation Methods

- Self-prepared written birth plans in 4 studies
- Structured birth plans in 2 studies
- Partially described interventions in 2 studies
- Formal birth plans in 1 study
- Written birth plans (with midwife assistance in one case) in 1 study

Detailed information about the specific components or development process of the birth plans was available for only a few studies.

Effects of Birth Plans

Maternal Physical Outcomes

Study	Delivery Mode	Labor Duration	Interventions Used	Complications
Abd El Aliem et al., 2020	No mention found	Significant decrease in mean duration of 1st stage and total duration of childbirth stages for intervention group (P 0.05)	No mention found	No mention found
Ahmadpour et al., 2022	Lower frequency of emergency caesarean sections in birth plan group (p=0.007)	No significant differences in duration of labor phases	Lower rate of intravenous analgesics use in birth plan group (1.3% vs. 10.2%, p $<$ 0.001	No mention found

Study	Delivery Mode	Labor Duration	Interventions Used	Complications
Ali et al., 2022	85% spontaneous childbirth in intervention group vs. 71.7% in control group	No mention found	No mention found	Lower rate of abnormal fetal heart rate complications in intervention group (11.7% vs. 31.7%, p<0.001
Deering et al., 2007	No significant difference in cesarean section rate (17% vs. 12%, p = 0.30)	No mention found	Lower epidural use in birth plan group (57% vs. 78%, p = 0.005); No significant difference in episiotomy rate (25% vs. 23%, p = 0.83)	No mention found
Faraha et al., 2015	No mention found	No mention found	No mention found	No mention found
Hadar et al., 2012	Lower intra partum cesarean section rate in birth plan group (11.7% vs. 20.3%, p = 0.016)	No mention found	Higher rate of epidural administration in birth plan group (81.2% vs. 68.8%, p = 0.004)	Higher rate of first and second degree perineal tears in birth plan group (72.1% vs. 25.5%, p < 0.001)
Hidalgo-Lopezosa et al., 2013	No significant differences in obstetric outcomes	No mention found	No mention found	No mention found
Hidalgo-Lopezosa et al., 2021	Lower cesarean section rate in primiparous women with birth plans (18% vs. 29%, p = 0.027)	Longer first phase of labor in birth plan group (6.28 hours vs. 5.20 hours)	Lower use of epidural analgesia (69.7% vs. 80.3%, p = 0.009), less early amniotomy (34.3% vs. 55.6%, p < 0.001), lower oxytocin use (42.6% vs. 55.1%, p = 0.010) in birth plan group	No mention found
Mohaghegh et al., 2023	Higher vaginal birth rates for women with birth plans (81.9% vs. 48.7%, p < 0.001)	Shorter labor stages for women with birth plans (p = 0.02)	Lower rates of episiotomy (43% vs. 58.3%, p < 0.001) and oxytocin use (33.1% vs. 45.5%, p = 0.043) in intervention group	No mention found

Study	Delivery Mode	Labor Duration	Interventions Used	Complications
Vu and Herness, 2020	Mixed results: One study showed no significant difference in CS rates (21% vs 16%; Odds Ratio 1.11; 95% CI, 0.61–2.04), another showed lower CS rates with birth plans (12% vs 20%, P=.016), and a third showed decreased CS rates with birth plans (26% vs 35%, P<.001)	No mention found	No mention found	No mention found

Delivery mode outcomes varied across the 7 studies reporting this information:

- 3 reported lower caesarean section rates with birth plans
- 2 reported higher spontaneous or vaginal birth rates
- 2 found no significant difference
- 1 reported mixed results

Labor duration data was available in 3 studies, with varied results:

- 1 study reported a significant decrease
- 1 study found no significant difference
- 1 study reported longer duration
- 1 study reported shorter duration

Intervention data was available in 5 studies:

- 2 reported lower overall intervention rates
- 2 reported lower use of analgesics or epidurals
- 1 reported higher epidural use
- 1 found no difference in episiotomy rates

Complication data was available in only 2 studies:

- 1 reported lower complications (abnormal fetal heart rate) in the birth plan group
- 1 reported higher complications (perineal tears) in the birth plan group

Overall, the results suggest a trend towards lower caesarean rates and fewer interventions with birth plans, but findings were not consistent across all studies. We found limited data on labor duration and complications, with mixed results in the few studies reporting these outcomes.

Psychological and Experience Outcomes

Study	Satisfaction Measures	Control Perception	Anxiety/Fear Levels	Birth Experience
Abd El Aliem et al., 2020	No mention found	No mention found	No mention found	Highly significant increase in women's empowerment scores after implementing birth plan ($p<0.001$)
Ahmadpour et al., 2022	Higher Childbirth Experience Questionnaire (CEQ) score in birth plan group ($p<0.001$)	Higher Support and Control in Birth (SCIB) score in birth plan group ($p<0.001$)	Lower Delivery Fear Scale (DFS) scores in birth plan group ($p=0.015$)	Improved childbirth experiences for birth plan group ($p<0.001$)
Ali et al., 2022	97% of intervention group reported higher satisfaction vs. 23.3% in control group	No mention found	No mention found	81.7% of intervention group had positive experiences vs. 36.7% in control group
Deering et al., 2007	No mention found	No mention found	No mention found	No mention found
Faraha et al., 2015	Statistically significant improvement in childbirth experiences and satisfaction for intervention group ($p<0.001$)	No mention found	No mention found	Statistically significant improvement in childbirth experiences for intervention group ($p<0.001$)
Hadar et al., 2012	No mention found	No mention found	No mention found	No mention found
Hidalgo-Lopezosa et al., 2013	No mention found	No mention found	No mention found	No mention found
Hidalgo-Lopezosa et al., 2021	No mention found	No mention found	No mention found	No mention found
Mohaghegh et al., 2023	Higher childbirth satisfaction in intervention group ($p < 0.001$)	No mention found	No mention found	No mention found

Study	Satisfaction Measures	Control Perception	Anxiety/Fear Levels	Birth Experience
Vu and Herness, 2020	One study reported lower satisfaction ratings in birth plan group: overall satisfaction (4.3 vs 4.8; P<.01), experience met expectations (3.3 vs 4.8; P<.01), felt in control (3.8 vs 4.5; P<.01)	One study reported lower ratings for feeling in control in birth plan group (3.8 vs 4.5; P<.01)	No mention found	No mention found

Satisfaction measures:

- 5 studies reported on satisfaction
- 4 studies reported higher satisfaction in the birth plan group
- 1 study reported lower satisfaction ratings

Control perception:

- 2 studies reported on control perception
- 1 study reported higher scores for feeling in control in the birth plan group
- 1 study reported lower ratings for feeling in control in the birth plan group

Anxiety/Fear levels:

- 1 study reported lower anxiety scores in the birth plan group

Birth experience:

- 4 studies reported on birth experience
- All 4 studies reported improved or more positive birth experiences for the birth plan group

Statistical significance:

- Where reported, most studies found statistically significant differences ($p<0.001$ or $p<0.01$) favoring the birth plan group
- One study reported lower satisfaction in the birth plan group ($p<0.01$)

We didn't find data for all measures in every study, which limits our ability to draw comprehensive conclusions across all studies.

Neonatal Outcomes

Study	Apgar Scores	Neonatal Intensive Care Unit (NICU) Admission	Other Neonatal Outcomes
Abd El Aliem et al., 2020	No mention found	No mention found	Positive effect on fetal outcomes (details not specified)
Ahmadpour et al., 2022	Higher first-minute Apgar scores in birth plan group (p=0.048), no difference in fifth-minute Apgar scores (p=0.731)	No significant difference (p=1.000)	No mention found
Ali et al., 2022	Majority of both groups had normal Apgar scores, with better outcomes in intervention group (81.7% vs. 66.6%)	No mention found	Baby weights were similar between groups
Deering et al., 2007	No mention found	No mention found	No mention found
Faraha et al., 2015	No mention found	No mention found	No mention found
Hadar et al., 2012	No mention found	No mention found	No mention found
Hidalgo-Lopezosa et al., 2013	No mention found	No mention found	Better umbilical artery cord blood pH values in birth plan group (p = .019)
Hidalgo-Lopezosa et al., 2021	Lower rates of 1 min Apgar scores 7 in birth plan group for primiparous women (8.1% vs. 20.6%, p = 0.010)	No mention found	Better umbilical cord pH (<7.20: 8.7% vs. 21.2%, p = 0.011), less need for advanced neonatal resuscitation (4% vs. 15.9%, p = 0.008) in birth plan group for primiparous women
Mohaghegh et al., 2023	No significant differences in neonatal APGAR scores (p = 0.163, p = 0.483)	No significant differences in NICU admissions (p = 0.19)	No mention found
Vu and Herness, 2020	No mention found	No mention found	No mention found

Apgar Scores:

- 4 studies reported on Apgar scores
- 3 reported better Apgar scores in the intervention or birth plan group
- 1 found no significant difference

NICU Admission:

- 2 studies reported on NICU admission

- Both reported no significant difference between groups

Other Neonatal Outcomes:

- 4 studies reported on other neonatal outcomes
- 3 reported positive effects or better outcomes in the intervention or birth plan group (including better umbilical cord pH and less need for advanced neonatal resuscitation)
- 1 reported similar outcomes between groups

The available data suggests a trend towards improved neonatal outcomes in the intervention or birth plan groups, particularly for Apgar scores and other outcomes such as umbilical cord pH. However, the limited number of studies reporting these outcomes and the lack of significant differences in NICU admissions highlight the need for more research in this area.

Implementation Factors

Birth Plan Format and Timing

Study	Format of Birth Plan	Timing of Preparation	Key Components
Abd El Aliem et al., 2020	Structured birth plan implied by "Birth plan fulfillment sheet"	No mention found	No mention found
Ahmadpour et al., 2022	Structured written birth plan	Prepared over two sessions with an educational booklet provided	Preferences for labor, mobility, eating and drinking, monitoring, pain relief, drug options, labor augmentation, pushing, amniotomy, episiotomy, infant care, and C-section
Ali et al., 2022	Self-prepared written birth plan with structured open-closed questions	During antenatal visits at the outpatient clinic, before childbirth	Labor preferences, management expectations, and interventions to avoid
Deering et al., 2007	Formal birth plans mentioned, but specific characteristics not detailed	No mention found	No mention found
Faraha et al., 2015	No mention found	No mention found	No mention found
Hadar et al., 2012	Ante-partum self-prepared birth plan, likely written	Prepared before labor, brought upon labor admission	No mention found
Hidalgo-Lopezosa et al., 2013	No mention found	No mention found	No mention found

Study	Format of Birth Plan	Timing of Preparation	Key Components
Hidalgo-Lopezosa et al., 2021	Self-prepared written birth plan	Prepared "before birth"	Labor preferences, pain management, delivery expectations, avoiding oxytocin, episiotomy, and caesarean section; allowing freedom of movement, intermittent monitoring, immediate contact with the newborn, early breastfeeding
Mohaghegh et al., 2023	Self-prepared written birth plan	Starting from the fifth session of childbirth preparation classes up to several weeks before labor	Expectations and preferences for hospital selection, birth attendance, clothing, support person, pain relief techniques, care during labor stages, and post-delivery care
Vu and Herness, 2020	Written birth plan mentioned in reviewed studies	No mention found	No mention found

Format of birth plans:

- 3 studies used self-prepared written birth plans
- 1 study each used structured, structured written, self-prepared, and written birth plans
- We didn't find detailed information on the format for 3 studies

Timing of birth plan preparation:

- 5 studies reported preparing birth plans before labor
- We didn't find timing information for the other 5 studies

Key components of birth plans:

- 4 studies provided detailed information on the components
- We didn't find detailed component information for 6 studies

When detailed, birth plan components typically included preferences for labor management, pain relief, interventions, and post-delivery care. However, the specific elements varied across studies.

Healthcare Provider Integration

Study	Healthcare Provider Involvement	Training or Education Provided	Integration into Care Process
Abd El Aliem et al., 2020	No mention found	No mention found	No mention found
Ahmadpour et al., 2022	Birth plan developed with guidance from a PhD student of Midwifery and an obstetrician	Educational booklet provided	No mention found
Ali et al., 2022	Guidance from researchers during antenatal visits	No mention found	No mention found
Deering et al., 2007	No mention found	No mention found	No mention found
Faraha et al., 2015	No mention found	No mention found	No mention found
Hadar et al., 2012	No mention found	No mention found	No mention found
Hidalgo-Lopezosa et al., 2013	No mention found	No mention found	No mention found
Hidalgo-Lopezosa et al., 2021	Midwives present during birth plan preparation	No mention found	No mention found
Mohaghegh et al., 2023	Guidance from a researcher	Birth plan integrated into childbirth preparation classes	Birth plan implemented after women were admitted to the maternity ward
Vu and Herness, 2020	One study mentioned midwife assistance in developing birth plans	No mention found	No mention found

Healthcare Provider Involvement:

- 5 studies reported on healthcare provider involvement
- In 3 studies, providers offered guidance in developing birth plans
- In 1 study, midwives were present during birth plan preparation
- In 1 study, midwives assisted in developing birth plans

Training or Education Provided:

- 2 studies reported on training or education
- 1 study provided an educational booklet
- 1 study integrated birth plans into childbirth preparation classes

Integration into Care Process:

- 1 study reported on integration into the care process
- In this study, the birth plan was implemented after women were admitted to the maternity ward

We found limited information on healthcare provider involvement, training provided, and integration of birth plans into the care process across the studies. When reported, healthcare providers were most commonly involved in guiding or assisting with birth plan development.

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