

## **Prenatal Bonding (BA) as a Breakthrough in Improving Pregnancy, Birth, and Postpartum Outcomes**

Anne Goertz-Schroth, Gerhard Schroth, MD, Raylene Phillips, MD

Prenatal Bonding (BA) is a method of supporting pregnancy that enables a pregnant mother to connect with her unborn child and opens the possibility of mutual communication between the gestational parent and her yet-to-be-born baby. Over time, these communications develop patterns that result in a growing sense of emotional connection, enabling them to experience birth together as a team, something that had never been considered possible by most people, including birth professionals, medical healthcare providers, and psychologists. This retrospective study reviewed the birth outcomes of 295 women who received this method of support during their pregnancies. Results showed that after Prenatal Bonding (BA) facilitation, the need for birth interventions and Cesarean sections are reduced, and breastfeeding rates are increased, while preterm birth, postpartum depression, and infantile colic are exceedingly rare. Because they have already created a connection, the postpartum period becomes a new phase of an existing relationship.

*Keywords:* bonding, colic babies, pregnancy, prenatal, preterm birth, postpartum depression

Medical advances over the last several decades have improved the safety of pregnancy, birth, and early infancy. However, maternal and infant mortality rates have not decreased at the rate needed to meet UNICEF's Sustainable Developmental Goals for 2030 (UNFPA, 2019; UNICEF, 2023), indicating that more can be done to optimize maternal and infant care. Researchers have established the connection between mental and physical well-being, and a growing body of research has applied this knowledge to pregnancy and birth. Kennell and Klaus demonstrated that

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The authors have no funding to disclose. Anne Goertz-Schroth is an educator, social worker, instructor, doula, provider for pregnancy and birth support, and trainer for Prenatal Bonding (BA). Gerhard Schroth, MD, is a psychiatrist, psychoanalyst, author, presenter, and mentor for International Prenatal Bonding (BA) trainings. Raylene Phillips, MD, MA, FAAP, FABM, IBCLC, is a neonatologist, infant-developmental specialist, lactation consultant, author, presenter, and student of Prenatal Bonding (BA). Anne Goertz-Schroth and Gerhard Schroth, MD, offer paid training in Prenatal Bonding (BA). This relationship may be perceived as a potential conflict of interest. The authors declare that this did not influence the study design, data collection, analysis, interpretation, or reporting. Acknowledgments: The authors thank Jenoe Raffai and Gyoergy Hidas for their contributions to the development of Prenatal Bonding (BA), as well as the colleagues who supported this research project through their evaluations. This is a revised reprint of the study originally published in 2023. Please send correspondence to Dr. Phillips: [rphillips@llu.edu](mailto:rphillips@llu.edu)

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the presence of a support person during labor is associated with a significant reduction in Cesarean birth rates (Kennell et al., 1991). Fredrick Leboyer advocated for seeing birth from the baby's perspective and adjusting birth practices to support the baby in a gentle and non-violent birth (Conley, 2010). Bowlby and Ainsworth developed a theory of attachment and researched the effects of secure and insecure mother-infant attachment in infants and toddlers (Bretherton, 1992). Phillips has described how uninterrupted skin-to-skin contact immediately after vaginal and Cesarean births supports mother-infant bonding and is associated with increased breastfeeding initiation rates, which are well-documented to improve maternal and infant outcomes (Centers for Disease Control and Prevention [CDC], 2021; Phillips, 2012, 2013). Increasing evidence demonstrates maternal mental health during pregnancy has direct effects on fetal and child development (Jeličić et al., 2022; Molenaar et al., 2019; Simons et al., 2019; Van den Bergh et al., 2020; Wu et al., 2022).

For almost 100 years, a focus on prenatal and perinatal psychology has shown that understanding and supporting maternal and infant mental health, even before birth, improves birth outcomes (Evertz et al., 2021; Janus, 2021). In the 1970s, Thomas Verny, a Canadian psychiatrist, and David Chamberlain, a United States psychologist, discovered in their separate therapeutic settings that many children and adults have memories from before, during, and after birth—often with profound long-term effects on their lives (Chamberlain, 1988; Verny & Kelly, 1981). Verny and Chamberlain independently discovered that when traumatic prenatal, birth, or infant experiences were revealed from the unconscious memory through hypnosis and other therapeutic techniques, mental health pathologies related to these traumas often resolved. The knowledge that prenatal and birth memories are stored in the unconscious mind and body memory was groundbreaking and led to new modalities of early preverbal trauma resolution.

This knowledge, in addition to providing new information about the prenatal mind, also raised awareness that an emotional connection between the pregnant mother and the unborn child is possible. It has been known since the 1990s that maternal-child bonding and attachment are critical to normal development (Bretherton, 1992). It was previously assumed, however, that bonding and attachment can only begin after birth. The paradigm-shifting knowledge that emotional connections can begin before birth opened the door to new, previously unimagined ways to support pregnancy, birth, and early postnatal development of the child and the family. Prenatal care providers began encouraging pregnant mothers to talk and sing to their babies and to visualize their babies growing and developing within their wombs. This interaction was initially assumed to be one-directional. Many mothers felt empowered to communicate with their babies, but few suspected they could communicate with them and receive communication back from their unborn babies while still within their wombs.

In the late 20<sup>th</sup> century, the Hungarian psychologist and psychoanalyst Jenoe Raffai, PhD and the Hungarian psychiatrist and psychoanalyst György Hidas, MD, developed a method of supporting pregnancies based on principles of psychoanalysis, naming their method initially Bonding Analysis, and later Prenatal Bonding (BA). This program enables a pregnant person to connect with their unborn child and opens the possibility of mutual communication between the

parent and their yet-to-be-born baby. In Prenatal Bonding (BA), parents and their unborn child can develop a deep inner relationship long before birth, enabling them to experience birth together as a team—something that had not before been considered possible by most birth professionals, healthcare providers, and psychologists. Feedback from the baby can even direct attention to problems in the pregnancy and lead to medical examination and intervention (Hidas et al., 2002; Schroth, 2021).

A Prenatal Bonding (BA) facilitation involves a thorough physical and psychological history of both parents. It seeks to identify, acknowledge, and clarify intergenerational traumas, beliefs, and ideologies that negatively affect pregnancy, birth, and parenting. Mothers (and birth partners) are guided in deep relaxation exercises and supported in connecting with their unborn baby in whatever way they and their baby choose. During these sessions, parents often experience mutual communication with their baby through feelings, body sensations, imagery, thoughts, or the baby's movements. Over time, these communications develop patterns, resulting in a growing emotional connection. By the time of birth, most mothers feel they already know their baby and understand their baby's personality. Because they have already created a connection, mothers find their newborns easy to feed and soothe. The postpartum period becomes a new phase of an already developed relationship (Schroth, 2021).

Raffai and Hidas used Prenatal Bonding (BA) facilitations since 1986 to support over 4350 pregnant mothers. Birth outcomes were noted to be strikingly positive but were never systematically tracked. After being trained by Raffai and Hidas, Gerhard Schroth, MD, and Anne Goertz-Schroth have been using Prenatal Bonding (BA) in Dr. Schroth's psychiatric practice in Germany and have also been teaching the method in Europe and the United States since 2011. More than 10,000 pregnancies have been facilitated by trained, certified Prenatal Bonding (BA) professionals in many countries across Europe and the United States (Schroth, personal communication, 2023). In this retrospective study, we report the most extensive quantitative and qualitative data about Prenatal Bonding (BA) birth outcomes collected to date.

## Methods

Evaluation questionnaires were used to collect reliable data on birth outcomes after Prenatal Bonding (BA) facilitations with one-hour follow-up interviews one month and six months after the birth. Mothers who participated in Prenatal Bonding (BA) gave voluntary consent to share data from the de-identified questionnaires. The first evaluation documented when the facilitation began, how many sessions were completed, gestational age at birth, place of birth, duration, and course of labor, use of medications and obstetric interventions during delivery, mode of delivery, postnatal behavior of the baby (e.g., sleeping and crying pattern), the progress of breastfeeding, the mother's subjective experiences with the baby, symptoms of postpartum depression, and the mother's self-reported rating of her experience with Prenatal Bonding (BA).

The second evaluation, done six months after the baby's birth, assessed the baby's further development, including the baby's sleeping pattern, crying, behavior, and motor skills, any illnesses, breastfeeding history, the mother's subjective experiences with the postpartum period

and expectations for the future, symptoms of postpartum depression, and the mother's self-reported rating of her experience with Prenatal Bonding (BA).

Outcomes of 295 Prenatal Bonding (BA) facilitations done by 45 Prenatal Bonding (BA)-certified colleagues were analyzed retrospectively. The professional backgrounds of facilitators varied widely, including midwives, gynecologists, psychotherapists, social workers, educators, and doulas who worked in settings of prenatal care, obstetrics, family counseling, and medicine. Working with pregnant women was their common professional experience. The facilitations were conducted in various cultural settings, including Germany, Switzerland, Austria, and France.

The 295 facilitations with Prenatal Bonding (BA) from 2017 through 2020 included 64 facilitations from 2017, 27 from 2018, 90 from 2019, and 74 from 2020. Facilitations were included in the analysis if they had a minimum of 12 sessions (range 12–29, average 19) and had completed the follow-up evaluations at 1 and 6 months after birth.

## Results

### Preterm Births

In this cohort of pregnant mothers (295), 292 women (99%) gave birth to full-term babies (37<sup>th</sup>–42<sup>nd</sup> week gestation), while 3 (1%) of babies were born preterm. Of the preterm births, two mothers (0.7%) gave birth in the 36<sup>th</sup> week, and 1 (0.3%) gave birth in the 34<sup>th</sup> week of pregnancy.

### Mode of Birth

After Prenatal Bonding (BA), 227 women (77%) began labor spontaneously, and 94 women (32%) gave birth with no medication or any other obstetric interventions. A total of 242 women (82%) gave birth vaginally, while a Cesarean section was clinically indicated for 53 births (18%).

### Place of Birth

A total of 261 births (88.5%) occurred in a hospital, 30 births (10.2%) occurred in a home setting, and 4 births (1.3%) occurred in freestanding birth clinics.

### Breastfeeding

After Prenatal Bonding (BA), 292 mothers (99%) successfully initiated breastfeeding. Only 3 women (1%) could not breastfeed after giving birth. Another 15 women (5%) could breastfeed partially, meaning they breastfed with supplemental feeding or breastfed for less than six months. At six months of age, 277 babies (94%) were still breastfed.

### Infant Crying and Infantile Colic

Only 1 baby (0.3%) in 295 facilitated cases met the criteria for infantile colic. In 2 cases (0.7%), crying for 30–60 minutes per day occurred for the first few weeks.

### Postpartum Depression

After Prenatal Bonding (BA) facilitation, 292 women (99%) were completely free from any symptoms of postpartum depression. Three mothers (1%) had some characteristics or symptoms of postpartum depression.

### Baby Blues

Eighteen mothers (6%) experienced symptoms of baby blues for less than two weeks, while 277 mothers (94%) of mothers were free from any symptoms of baby blues.

## Discussion

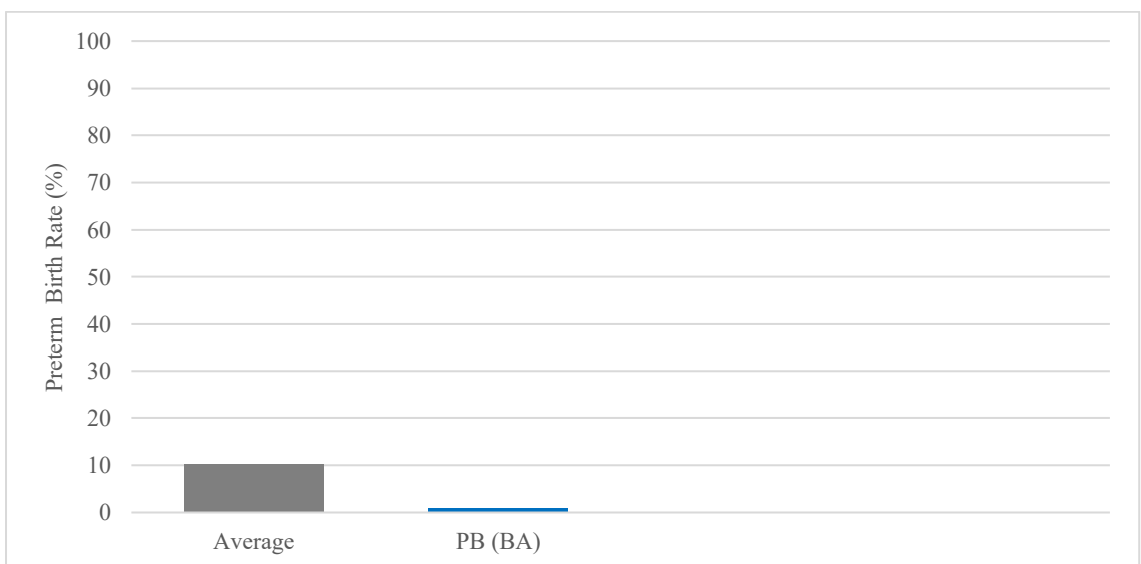
This retrospective study consistently found improved maternal and infant birth outcomes in mother-baby dyads who had experienced Prenatal Bonding (BA) facilitation compared to averages found in other studies.

### Preterm Births

In this cohort of 295 facilitated pregnant mothers, 99% gave birth to full-term babies (37<sup>th</sup>–42<sup>nd</sup> week gestation), while only 1% were born preterm (see Figure 1). In the earliest birth (34 weeks gestation), there were multiple uterine surgeries in the mother’s medical history. For comparison, rates of preterm births in Europe range from 5.3% to 14.7%. In Germany in 2017, the rate was 8.6% (Berger et al., 2019). In the United States, 1 in 10 babies (10.2 %) was born preterm in 2019 (March of Dimes, 2022).

### Figure 1

*Preterm Birth Rate: Average United States vs. Prenatal Bonding (BA)*



In Germany and many European countries, preterm birth rates have not decreased for almost ten years. Clinical-scientific research thus far has focused on identifying medical risk factors and their prevention. Many risk factors can be avoided by counseling pregnant women at the start of prenatal care, by maternal lifestyle changes, and by reducing stress during pregnancy, but none of these interventions are completely effective in preventing preterm birth (Berger et al., 2019).

Preterm birth continues to be a major problem in perinatal medicine. It is defined as a birth before 37 completed weeks of gestation. To better appreciate the significance of reducing preterm birth rates, it is helpful to focus on the consequences of preterm birth in general. Preterm birth is the leading cause of death among children accounting for 18% of deaths in children younger than five years of age and 35% of infant deaths in the first month (28 days) after birth (Walani, 2020). Morbidity and mortality rates vary by country but universally increase with decreasing birth gestational age (Bell et al., 2022; Manuck et al., 2016). Premature births often require care in a Neonatal Intensive Care Unit (NICU) for days, weeks, or months. This can present a massive psychosocial burden for affected families with significantly higher rates of posttraumatic stress disorder and anxiety than the general population and a substantial financial burden for families and the healthcare system (Malouf et al., 2021; Walani, 2020).

Because premature infants usually require immediate medical interventions, skin-to-skin contact between mother and newborn in the first hour after birth is usually not possible. Uninterrupted skin-to-skin contact with the mother is important for physiologic stability, bonding, and breastfeeding, all of which support the child's optimal physical and emotional development (Phillips, 2013). Preterm infants in the NICU are exposed to multiple medical and care interventions daily, many of which are painful and most of which are stressful. Parents and infants are often separated, adding to the physiologic and emotional stress on babies and parents (Morgan et al., 2011).

In addition to the short-term consequences after preterm birth, there are often severe long-term consequences. Infants born prematurely have a significantly higher risk of being diagnosed with attention deficit disorder as children and adults (Murray, 2016; Perapoch et al., 2021; Robinson et al., 2022). Children and adults born prematurely can often have difficulties coping with transitional life events, and parents often continue to worry about their prematurely born children for years (Treyvaud et al., 2014). Preterm birth is also considered one of the main risk factors for disability-adjusted life years (DALY) lost due to sickness, disability, or early death (Berger et al., 2019).

In addition to the emotional consequences, high financial costs are associated with preterm birth. A United States study in 2016 calculated that each prematurely born child results in average costs of approximately \$49,140 in the first year of life, four times higher than the costs for term infants (\$13,024). In the first year of life, the total annual costs for premature babies in the United States reach up to \$25.2 billion (Waitzman et al., 2021).

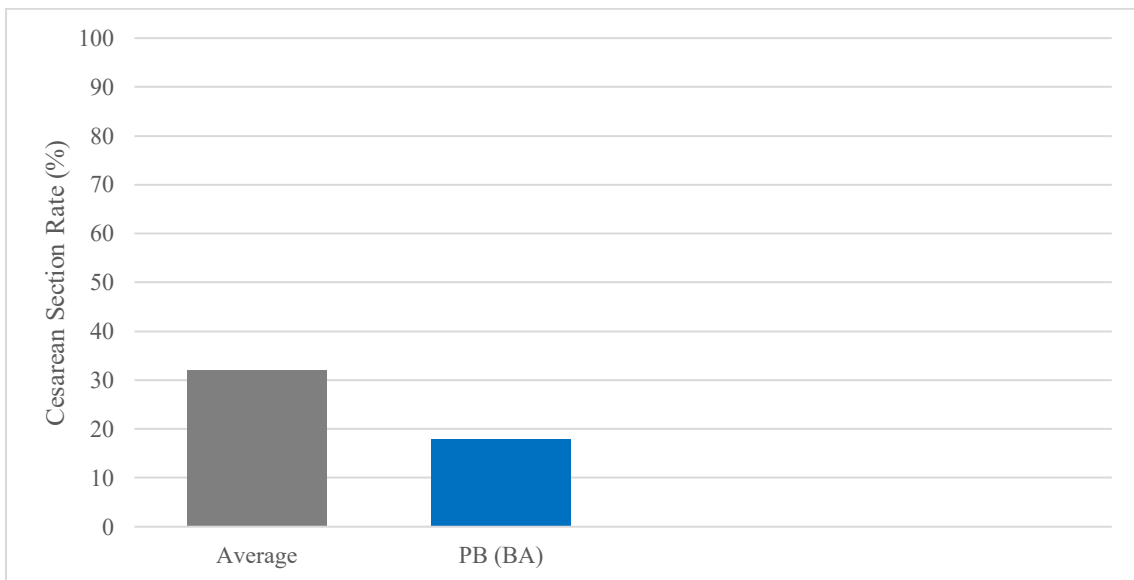
Causes and preventions of preterm birth continue to be studied, and effective therapeutic strategies continue to be investigated. Prenatal Bonding (BA) can significantly contribute to this area of research.

## Mode of Birth

In this cohort, 82% of women had a vaginal delivery, while 18% had a Cesarean section (see Figure 2). By comparison, the United States National Vital Statistics reports a Cesarean section rate of 31.7% in 2019 (Osterman, 2022). While a Cesarean section delivery can be lifesaving, it comes with the risks of major abdominal surgery, well-documented risks of changes in infant microbiome, and delayed postnatal bonding and breastfeeding if mother and baby are separated after birth. Due to these known risks, efforts have been made to reduce elective Cesarean section birth rates with varied success (World Health Organization [WHO], 2021). The WHO recommends using non-clinical interventions to help reduce cesarean section rates (WHO, 2018). Prenatal Bonding (BA) has been shown to be a successful intervention to safely reduce the rate of Cesarean section births.

**Figure 2**

*Cesarean Section Rates: Average United States vs. Prenatal Bonding (BA)*



It was also found that 32% of women gave birth without medical interventions, such as synthetic oxytocin, epidural anesthesia, vacuum extraction, or episiotomy. In Germany, only 8% of women gave birth without medical intervention (Sayn-Wittgenstein, 2011). Notably, the rate for intervention-free births was four times higher following Prenatal Bonding (BA).

## Place of Birth

In the cohort of pregnant mothers facilitated in Prenatal Bonding, 88.5% gave birth in a hospital setting, while 11.5% gave birth outside of the hospital (1.3% in a birth center and 10.2% at home). By comparison, a Quality Report for the Society for Out-of-Hospital Obstetrics

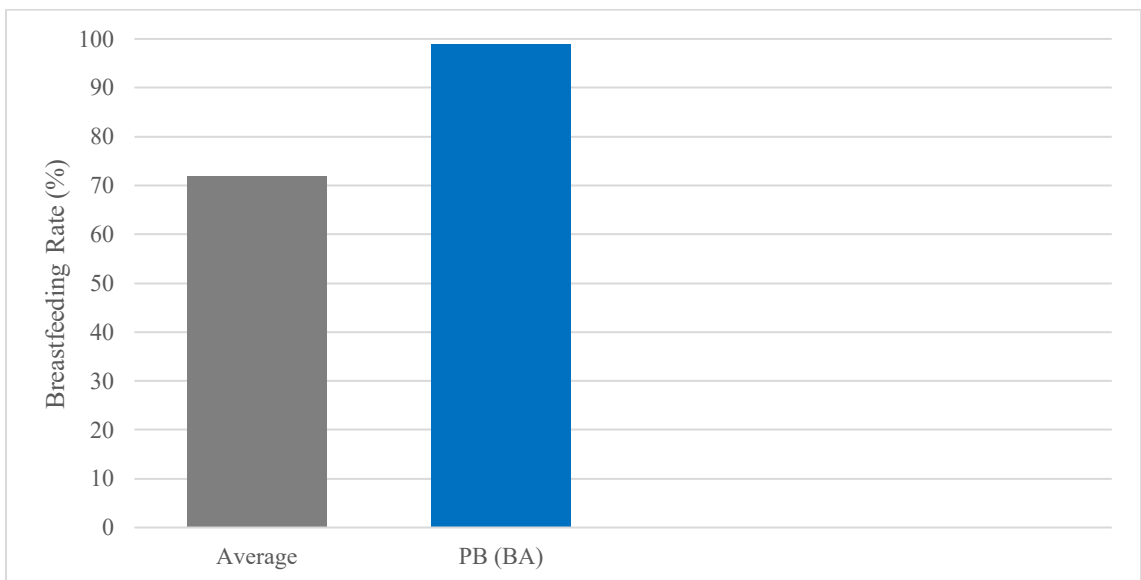
describes a 1.3% out-of-hospital births rate in Germany in 2019 (QUAG, 2019). The out-of-hospital birth rate for women facilitated with Prenatal Bonding (BA) was more than eight times higher than Germany’s average and may reflect a lower rate of anxiety in birthing mothers before birth and greater confidence in their competence and power to have a physiological birth without the need for medical interventions.

### Breastfeeding

With Prenatal Bonding (BA) facilitation, mothers have a high awareness of the value of breastfeeding, and 99% were successful at initiating breastfeeding after birth (see Figure 3), while 94% were still breastfeeding six months after birth (see Figure 4). In comparison, a German study (2017–2019) found that 74.1% of newborns were exclusively breastfed after birth, and after six months, only 66.1% of infants were still breastfed (Hockamp, 2021; Kersting et al., 2020).

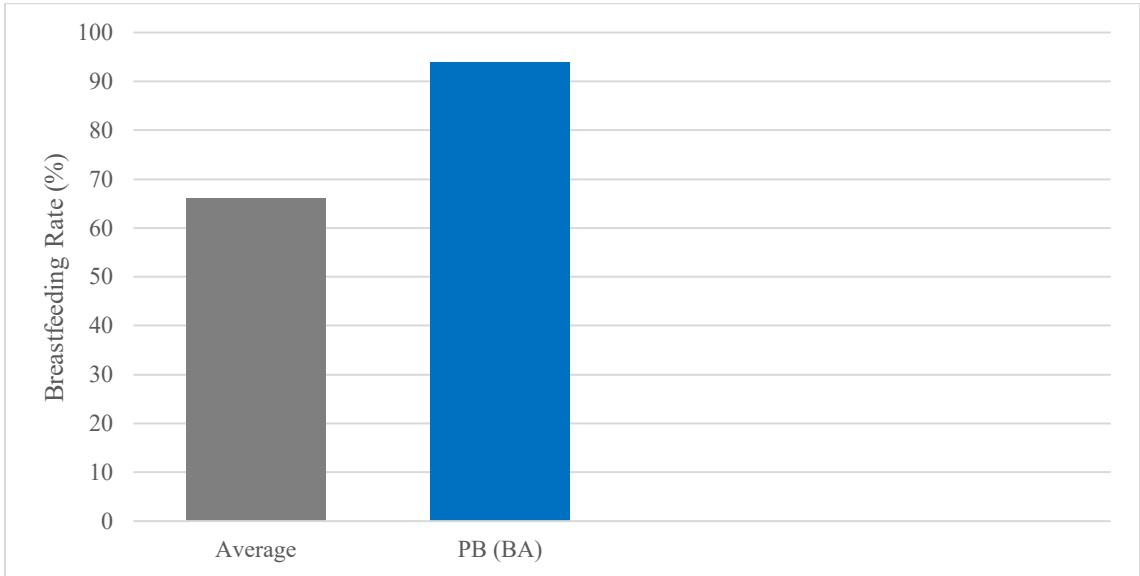
**Figure 3**

*Breastfeeding Rates After Birth: Average Germany vs. Prenatal Bonding (BA)*



**Figure 4**

*Breastfeeding Rates After 6 Months: Average Germany vs. Prenatal Bonding (BA)*



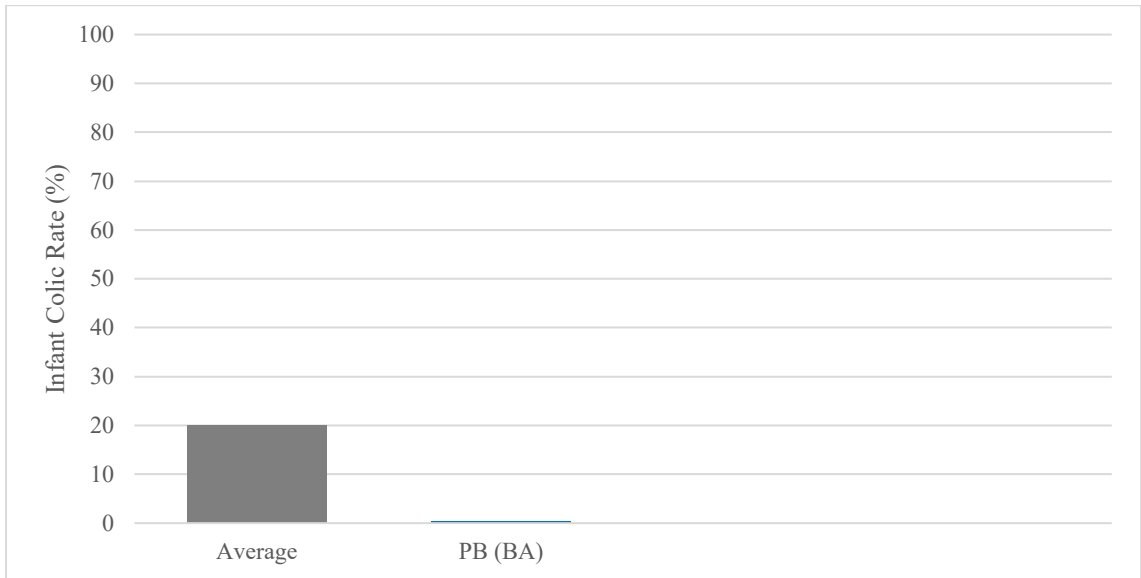
The health benefits of breastfeeding have been well-documented for many years (CDC, 2021). Any intervention that supports and increases breastfeeding rates deserves attention.

### **Infant Crying and Infantile Colic**

In the group of mothers who experienced Prenatal Bonding (BA), only 1 baby (0.3%) had crying that fit the description of infantile colic (see Figure 5). In contrast, according to the German Society for Child and Adolescent Psychiatry, about 20% of newborns are assessed as infantile colic babies (Santos et al., 2015).

**Figure 5**

*Infantile Colic Rates: Average Germany vs. Prenatal Bonding (BA)*



According to a definition of colic from the German Society for Pediatrics and Adolescent Medicine, babies are said to have “infantile colic” if they cry 3 hours or more per day, resisting every effort to soothe for an extended period, sometimes for over three months and more. Characteristics of infantile colic babies include inconsolable crying with increasing overtiredness and overstimulation of the infant and the parents. Infantile colic is also considered a risk factor for later, further behavioral problems (Zeevenhooven et al., 2022).

Babies of mothers who have experienced Prenatal Bonding (BA) rarely cry for extended periods. On the Prenatal Bonding (BA) evaluation questionnaire given at one month and six months after birth, the answer most often given to describe crying is “The baby cries little and is easily comforted.” A mother reported, “You can count on the fingers of one hand how many times Kati has cried for a while. Only once did she cry for 10 minutes, and we did not understand why. From time to time, she cries briefly to communicate when she is hungry or wants to be close to me. As soon as her needs are met, she calms down and is happy again.”

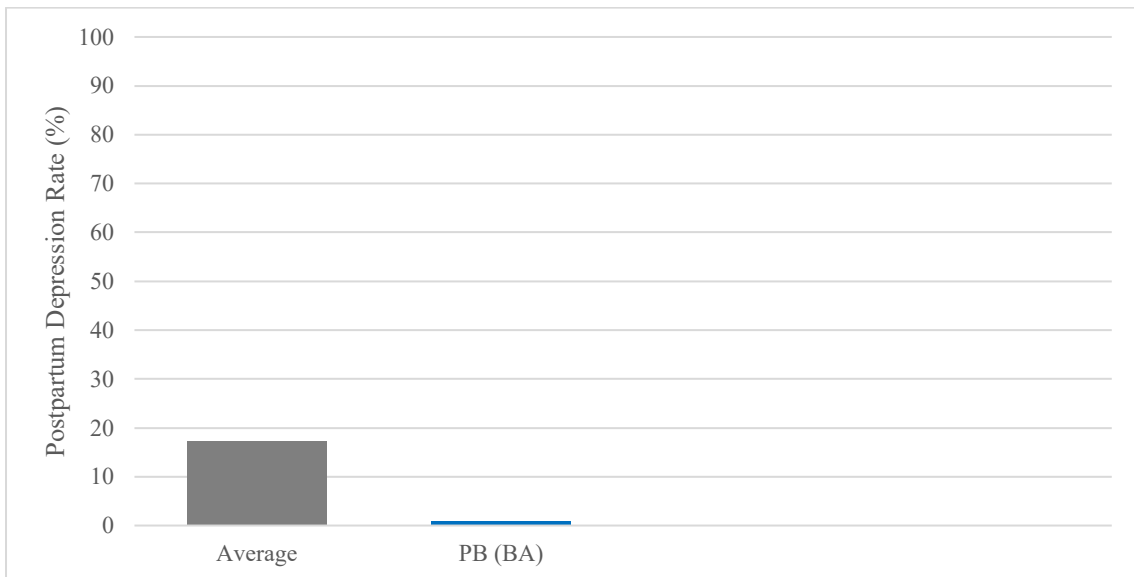
**Postpartum Depression**

From the researched cohort of 295 pregnant women, only 3 mothers (1%) had some characteristics or symptoms of Postpartum Depression (PPD) (see Figure 6). Postpartum Depression is a major depressive disorder that occurs in the first few months after childbirth and lasts several months or longer. While a comprehensive overview of recent literature found postpartum depression (PDD) in 17.2% of the world’s population, including a range of 0.5–60%

(Wang et al., 2021), it is a rare occurrence among mothers who experienced Prenatal Bonding (BA) facilitation (Schroth, 2021).

### Figure 6

*Postpartum Depression Rate: Average Global vs. Prenatal Bonding (BA)*



This low rate is particularly noteworthy because almost a fifth of the cohort (19.5%) began the Prenatal Bonding (BA) facilitation while still suffering either from postpartum depression diagnosed after a previous birth or from symptoms of trauma after a previous traumatic birth. They specifically chose Prenatal Bonding (BA) facilitation to seek professional support in recovering from symptoms of existing PPD or trauma. It is, therefore, clear that the reduction of PPD we saw after Prenatal Bonding (BA) facilitation did not result from a “selection bias” of mothers predisposed to good mental health. On the contrary, many pregnant women sought the program because of already existing severe mental suffering, and with the hope for healing. Many were being treated with anti-depressive medication, thus exposing the unborn babies to additional risks. All mothers who began Prenatal Bonding (BA) facilitation while on medication for pre-existing PPD no longer required medication within a short time after beginning the program.

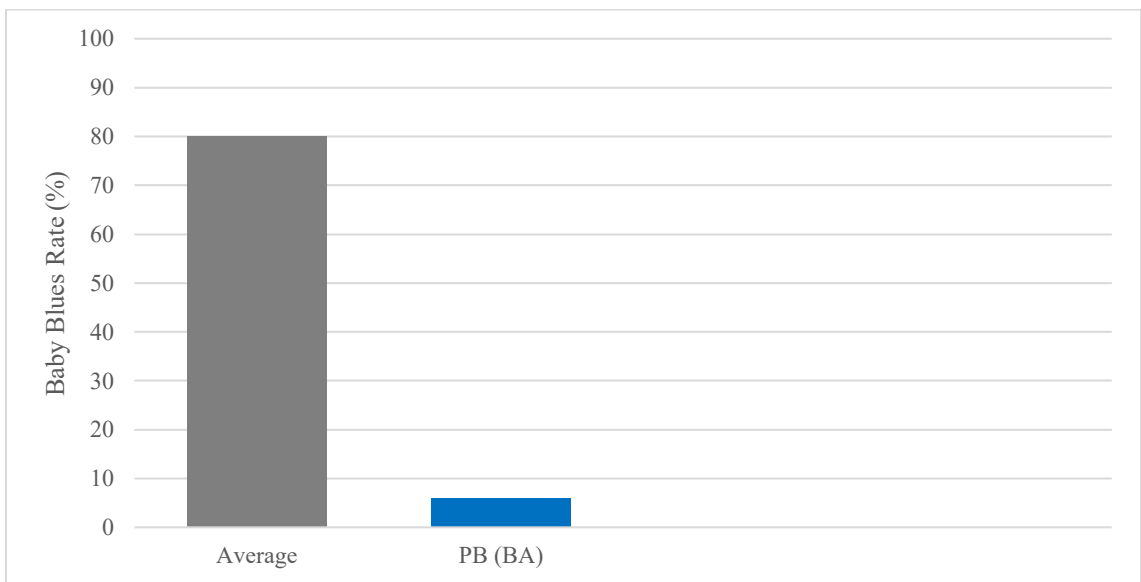
Postpartum depression is highly prevalent worldwide and results in untold suffering to mothers, babies, and families, even leading to delayed development in infants of mothers with PPD (Bernard-Bonnin, 2004, Faisal-Cury et al., 2021). In reducing rates of Postpartum Depression, the Prenatal Bonding (BA) method achieves positive results without the need for any medication (Schroth, 2015).

### Baby Blues

Baby Blues is a common depressive mood condition after birth, for a few hours up to 2 weeks. The change of hormonal conditions after delivery has often been given as the medical explanation for this short depressive mood imbalance. Baby blues occurs in Germany with a frequency of up to 80% (Hübner-Liebermann et al., 2012; Landeskoordination, 2015). However, among mothers who received Prenatal Bonding (BA) facilitation, only 6% experienced baby blues (See Figure 7). This result may challenge the common assumption that baby blues is primarily the result of hormonal changes that occur in all mothers.

**Figure 7**

*Baby Blues Rates: Average Germany vs. Prenatal Bonding (BA)*



### Comparison of Two Different Prenatal Bonding (BA) Cohorts

Previous research from 2013 through 2017 was presented at the International Conference on Prenatal Bonding (BA) in Cologne in 2018 (Goertz-Schroth, 2019). In that study, a cohort of 188 pregnant mothers was facilitated by 37 certified Prenatal Bonding (BA) professionals from different countries, including the United States. The results were very similar to the results reported in the current analysis (see Figure 8). Notable exceptions include an increase in Cesarean section births from 12% in the first study to 18% in the current study, which may be related to the increase in hospital births also seen in the current cohort.

**Figure 8***Comparison of First (2013–2017) and Second (2017–2020) Prenatal Bonding (BA) Cohorts*

Birth Outcomes	1st Cohort (n = 188) 2013–2017	2nd Cohort (n = 295) 2017–2020
Full term babies	97.5	99.0
Preterm babies	2.5	1.0
Vaginal births	88.0	82.0
Cesarean section births	12.0	18.0
Hospital births	80.5	88.5
Out-of-hospital births	19.5	11.5
Breastfeeding rate after birth	98.5	99.0
Breastfeeding rate after 6 months	92.0	94.0
Infantile colic	0.0	0.3
Postpartum depression	2.0	1.0
Baby blues	5.0	6.0

*Note.* Numerical values are percentages.

The similarity of results across two cohorts demonstrates the reliability of Prenatal Bonding (BA) facilitated support, delivered to different groups of pregnant mothers by different professionals over seven years. A mother who participated in the first cohort reported:

Prenatal Bonding (BA) was such a relief for us. Our bond was strong long before birth, and that made it so easy. Giving birth went so incredibly well. It felt like Emma already knew me and was well prepared for birth and had a strong relation with us from the first moment. Now I'm surprised how easy it is with my two kids and the daily routine and housekeeping. After the birth of my first child, I didn't know how I would have managed without my mother's help. I was so stressed. Now I have two children, and I don't need any help at all. (Goertz-Schroth, 2019)

### **Conclusion**

This retrospective study sought to answer the effects of Prenatal Bonding (BA) on pregnancy, birth, and postpartum outcomes. All the parameters demonstrated improving outcomes after Prenatal Bonding (BA) facilitation, with most babies born vaginally at full term and able to initiate breastfeeding successfully. In the postpartum period, almost all babies were easily soothed, with a very low percentage of infantile colic, and a high percentage of babies continued to be breastfed for at least six months. The rates of baby blues and postpartum depression were exceedingly low. All these factors help to continue in the postpartum period the maternal-infant bond that began before birth and supports the foundation for a healthy and trusting parent-child interaction with increased stress-resilience for the whole family system.

This retrospective analysis has demonstrated the safety and reliability of Prenatal Bonding (BA) as an effective support for pregnant mothers and has shown consistent positive outcomes over time. The method can be learned and successfully applied by professionals from many different professional backgrounds. It has proven to be an effective intervention to support pregnant mothers, their unborn babies, and families in creating deeply meaningful connections long before birth.

Strengths of this study include the constancy of markedly improved birth and postpartum outcomes over time with various professional facilitators in varied settings. Limitations of the study include the retrospective study design, the relatively small sample size, and the lack of maternal prenatal demographic information. Additional research is needed to further validate these results.

By increasing the chance of spontaneous vaginal birth and reducing the risk of birth trauma, Prenatal Bonding (BA) can help prevent serious adverse outcomes, which often lead to chronic illness later in life (Mead, 2020). By significantly reducing the risk of postpartum depression, much maternal, infant, and family suffering can be prevented. By supporting improved birth outcomes and secure bonds of attachment, Prenatal Bonding (BA) helps lay the foundation for optimal physical and mental health throughout the lifespan, contributing to a healthier, more peaceful society.

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