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## Influence of elective and emergency cesarean delivery on mother emotions and bonding



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### ABSTRACT

**Background:** Previous studies have indicated that mode of delivery could have a negative effect on bonding.

**Aims:** To assess feelings towards newborn infants in mothers who delivered by cesarean delivery, elective (EICD) or emergency (EmCD).

**Study design:** This observational prospective study took place at the Division of Perinatal Medicine, Policlinico Abano Terme, Abano Terme, Italy, from September 2014 to April 2015.

**Subjects:** The sample included 573 puerperae divided into three groups: women undergone EICD ( $n = 73$ ; 12.73%), women undergone EmCD ( $n = 81$ ; 14.13%) and women who underwent vaginal delivery (VD) ( $n = 419$ ; 73.12%).

**Outcome measures:** The instrument used was the Mother-to-Infant Bonding Scale (MIBS; Taylor et al., 2005), a self-report test to measure mother's feelings towards her baby. High scores indicate worse mother-to-infant bonding and a score  $\geq 2$ , established as cut-off, indicates an altered bonding.

**Results:** The mean MIBS global score was  $0.50 \pm 1.05$  in the VD mothers,  $0.67 (\pm 1.14)$  for EICD mothers and  $0.92 (\pm 1.05)$  for EmCD mothers, resulting significantly higher in EmCD mothers ( $p < 0.001$ ). The percentage of altered bonding (Score  $\geq 2$ ) in the three groups was of 11.21% ( $n = 47$ ) in VD, 17.80% ( $n = 13$ ) in EICD and 23.45% ( $n = 19$ ) in EmCD, significantly higher in EmCD women ( $p < 0.006$ ). In addition, EmCD mothers scored significantly higher Joyful ( $0.074 \pm 0.26$  vs  $0.185 \pm 0.39$ ;  $p < 0.005$ ) and Disappointed ( $0.063 \pm 0.25$  vs  $0.123 \pm 0.36$ ;  $p < 0.008$ ) subscales.

**Conclusions:** It was found that EmCD negatively affects mother bonding and opening emotions, and originates in mother feelings like sadness and disappointment for the unplanned delivery evolution.

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### 1. Introduction

The relevance of maternal bonding and its influence for the child's development has been increasingly explored over the last decades. The early postpartum period was described as a sensitive, critical period for the establishment of tight bonding [1], possibly influenced by routines separating mother and newborns at birth [2–4] and by delivery mode [5].

Although some evidence exists to show that non-vaginal birth can make bonding between mother and infant difficult, studies failed to clearly distinguish between elective (EICD) and emergency (EmCD) cesarean deliveries [6]. This is relevant, considering that cesarean section rates are progressively rising in many high- and middle-income Countries of the World, mainly due to increase in primary EICD [7]. EmCD

is defined as an unplanned delivery performed after onset of labor, an EICD is defined as non-emergency delivery planned for medical reasons and occurring before initiation of labor. There are many reasons why a woman might choose to have a EICD including fear of pain from labor and body image among others. In addition, a scheduled cesarean delivery allows a woman to choose the time and date of delivery for reasons related to superstition or luck [8]. Conversely, emergency deliveries are usually carried out for maternal medical reasons (failure to progress or cephalopelvic disproportion) or fetal reasons (fetal distress). Such emergency circumstances are a significant stress factor for the women and one would anticipate that this stressful event could contribute to an increased risk of altered bonding. Much of the research findings in this setting are, however contradictory [9], given the different methods used to assess the mother–infant relationship, feelings, and emotions, based on interviews, observations, and questionnaires [10]. In addition, research on this subject also impacts on reciprocal relationship between surgical delivery, bonding, and puerperium, a period during which previously dormant psychological issues such as fears about physical

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changes, role adaptation, psychosocial stress, and mothering abilities come to the surface, resulting also of great importance to the psychology of bonding and has major consequences for mother, family, and child [11,12]. Nevertheless, evidence as to the nature of these changes is equivocal and reciprocal relationships should be studied to determine their validity [13].

Hence, there is a need to see the contextual relevance of these determinants to our own puerperae population, representative of developed, industrialized country supporting advanced educational levels, good socio-economic status, low and late fertility, and high cesarean section rates. We therefore undertook an analytical study by the Mother-to-Infant Bonding Scale (MIBS, Taylor et al. 2005) [14] with a reference group of puerperae, to determine the direction and magnitude of the effect of delivery mode, vaginal delivery (VD) and EICD or EmCD, on bonding and emotions in singleton, at term, uncomplicated pregnancies.

## 2. Materials and methods

This observational prospective study was performed at the maternity wards of the Division of Perinatal Medicine of Policlinico Abano Terme, Abano Terme, Italy, performing approximately 1000 births per year with a cesarean delivery rate of 27%, between September 2014 and April 2015. The hospital where the study took place is located in an industrialized area supporting advanced educational levels, good socio-economic status, occupation, and low and late fertility. Institutional Review Board approval (Policlinico Abano Terme) was obtained before the study began.

The study group consisted of 573 consecutive mothers of singleton, healthy neonates delivered at term and managed in regimen of rooming in. Women which didn't speak Italian, underwent general anaesthesia, with psychological disorders under treatment and with infants hospitalized in NICU, unable to understand validated test, and/or prone to post-partum physical and psychological problems, were excluded from the study.

After informed consent was obtained, they answered questions on sociodemographic status before and after pregnancy, obstetric history, smoking, psychological care, plan to lactate an infant without medical or obstetrical complications precluding routine discharge. The following data were also collected for the babies: gestational age, birth weight, sex, and mode of delivery.

### 2.1. Measures

The Mother-to-infant Bonding Scale (MIBS; Taylor et al., 2005) is an eight-item self-rating scale, describing 'how the mother feels towards her infant' [14]. Each item (Loving, Resentful, Neutral or Felt nothing, Joyful, Dislike, Protective, Disappointed and Aggressive) describes an emotion that the mother may experience towards her infant and is a statement which is rated on a 4-point Likert scale, ranging from "Very much" (0) to "Not at all" (3). The range for the total score is 0–24. Positive and negative emotions are scored in the opposite way. Higher total scores indicate worse bonding. The Cronbach alpha for the bonding scale was 0.71. A score of 2 or more on the MIBS has been shown to indicate poor bonding and was used as the cut-off in this study [15].

Participants completed the MIBS at the second day post-partum, pre discharge. Additional details are reported elsewhere [16].

Mothers were grouped according to mode of delivery; the groups were defined as VD, EICD, and EmCD. All items were summarized with standard descriptive statistics such as means and standard deviations. For statistical analysis, categorical data were analyzed by the  $\chi^2$  test, while continuous data were analyzed by the Student's *t*-test using the Statistical Package for Social Sciences software for Windows, version 15.0 (SPSS Inc., Chicago, IL). A  $p < 0.05$  was considered statistically significant.

## 3. Results

Mothers and children's anthropometrical and clinic characteristics are reported in Table 1

Participants were aged 18 to 46 years (Mean  $\pm$  SD, 33.18  $\pm$  4.71). Of the total sample, the highest educational degree was primary school degree in 10.99%, high school diploma in 50%, a graduate degree in 13.61% and a post-graduate degree in 22.3% of cases. The 0.87% was single, the 57.7% was married and the 38.9% was cohabitating. The average gestational week was 39.19  $\pm$  1.26, children were 46.77% male and 52.87% female. The mean neonatal body weight was 3092.04  $\pm$  451.8 g, length was 50.02  $\pm$  1.88 cm and head circumference was 33.9  $\pm$  3.44 cm. Among the mothers, 55.84% were primiparae, 34.20% secundiparae, and 9.4% were tertiparae.

VD mothers were 419 (73.12%), EICD mothers were 73 (12.73%) and EmCD mothers were 81 (14.13%). Anthropometrical characteristics of study participants were comparable and did not significantly influence delivery mode.

MIBS global score and items scores according to delivery mode are shown in Table 2.

The (Mean  $\pm$  SD) MIBS global score was 0.50  $\pm$  1.05 in the VD mothers, 0.67  $\pm$  1.14 for EICD mothers and 0.92  $\pm$  1.05 for EmCD mothers, resulting significantly higher in EmCD mothers ( $p < 0.001$ ). The percentage of altered bonding ( $\geq 2$  score) in three groups was of 11.21% ( $n = 47$ ) in VD, 17.80% ( $n = 13$ ) in EICD and 23.45% ( $n = 19$ ) in EmCD, resulting significantly higher in EmCD women ( $p < 0.006$ ). In addition, EmCD mothers scored significantly higher Joyful (Mean  $\pm$  SD, 0.074  $\pm$  0.26 vs 0.185  $\pm$  0.39;  $p < 0.005$ ) and Disappointed (0.063  $\pm$  0.25 vs 0.123  $\pm$  0.36;  $p < 0.008$ ) subscales scores, and marginally significant Dislike subscale score (0.063  $\pm$  0.25 vs 0.123  $\pm$  0.36;  $p < 0.072$ ).

## 4. Discussion

This study investigated the influence of delivery mode, vaginal and surgical, on mother emotions and bonding by MIBS administered in early puerperium. We found significantly worse bonding in mothers who underwent EmCD, but not EICD, in comparison to VD mothers.

These findings indicate that mothers which mode of delivery had to change during childbearing from the expected standard vaginal experience differences in bonding that significantly alter feelings towards their newborn infant and elicit negative emotions in the joyful, disappointed and, to a marginal extent, dislike items. Future research will address the impact of different delivery types as well as mental health factors on mothers' psychological stress.

The relationship between delivery mode and bonding is complex [11–13] and not completely understood, and is perhaps bidirectional (i.e., maternal emotions might causally interfere with labor and unsuccessful vaginal delivery might contribute to altered bonding), so it is unclear if it is maternal feeling towards the infant that influences delivery mode, or delivery mode that causes altered mother to infant bonding [17,18]. In most studies there is also no clear definition of the time-course of pre-labor, EmCD or in labor EmCD [6].

Although there is research supporting the idea that surgical birth circumstances may have a negative impact on maternal-infant bonding [5, 6], the in puerperium psychosocial and emotional factors that may impact a woman's ability to form a healthy bond with her infant have been examined only to a limited extent and are scarce. Our study design clearly assessed exposure (delivery mode) before outcome (MIBS), thus allowing us to draw clear time-oriented conclusions. This is relevant, considering that mother and child are bound by a process that begins and develops with the pregnancy. This relationship is indeed instrumental to an optimal maternal–infant adaptation [19]. In fact, previous studies showed that women with stronger attachment to their children are most often sensitive to their children's needs. The benefits of such sensitivity are evident in several fundamental realms of the infant's future psychosocial function and development of personality traits, such

**Table 1**  
Mothers and child's anthropometrical and clinic characteristics, according to delivery mode.

	VD n = 419	EICD n = 73	EmCD n = 81	Total n = 573
Mothers:				
Age, years	32.86 (± 4.72)	34.12 (± 4.44)	33.86 (± 4.70)	33.1 (± 4.71)
Nulliparae	53.93%	45.20%	75.30%	55.84%
Neonates:				
Birth weight, g	3089 (± 451.2)	3015 (± 489.5)	3071.35 (± 446.0)	3092.04 (± 451.84)
Length, cm	49.99 (± 1.82)	49.72 (± 1.92)	50.11 (± 2.18)	50.02 (± 1.88)
Head circumference, cm	33.63 (± 4.01)	34.61 (± 1.43)	34.46 (± 1.33)	33.93 (± 3.44)
Male	48.83%	51.63%	55.52%	51.99%

VD, vaginal delivery; EICD, elective cesarean delivery; EmCD, emergency cesarean delivery. Data expressed as Mean ± Standard Deviation or Number, n, and percent (%).

as curiosity, sociability, self-confidence, independence, collaboration, and honesty, which are gradually formed [20]. Conversely, weaker mother-infant bonding experiences lead to an impaired emotional and mental development, with important consequences such as poor social interactions and higher rates of escape from school; moreover, these children are less able to form long-term relationships and show more aggressive behaviors, compared to others [19]. In addition, research on this subject also impacts on reciprocal relationship between surgical delivery, bonding, and the complex influence of different psychosocial, demographic variables, such as maternal age, maternal education, infant sex, parity, and peripartum mood states, emotions or anxiety. Hence, there is a need to outline the contextual relevance of these determinants to our own puerperae population, representative of an industrialized country supporting advanced educational levels, good socio-economic status, low and late fertility, and high cesarean section rates.

We believe ours is the first study to separately examine psychosocial and surgical factors such as EICD and EmCD as correlates of maternal-infant bonding. Although some evidence exists to show that non-vaginal or traumatic birth can make bonding between mother and infant difficult, the women who delivered by cesarean section in our study differed significantly in maternal-infant bonding and emotions only if childbearing was expected as standard vaginal delivery, suggesting that the part of the experience of surgical birth related to maternal-infant bonding may be more complex than what simply identified by the birth mode [6,7]. Measurement of an intricate concept such as maternal-infant bonding can present challenges, and there are many inconsistencies in the way bonding is currently measured. Tools that examine a mother's emotional response to her infant via self-report are available [10]. Most notable for use in the general population is the Mother-to-Infant Bonding Scale (MIBS) [14,15].

However, this study has many limitations that deserve comment. First, the sample of women in the MIBS study, living in an industrialized

area of North-Eastern Italy supporting low and late fertility and high cesarean deliveries rates, is not a representative sample of women experiencing surgical birth in other industrialized Countries [21]. Our study design also did not allow the examination of a cause and effect relationship between prenatal psychosocial or emotional factors, assisted reproductive technology treatment, parity, and/or delivery mode (i.e. indication for CS), and maternal-infant bonding, as most of the variables were measured in a cross-sectional nature at 2 days postpartum [22].

In conclusion, in this study we found strong evidence that mothers who have to change mode of delivery during childbearing expected as standard vaginal delivery have to face a worsened bonding and altered joyful, disappointed and, to a marginal extent, dislike emotions. It is important that researchers measuring maternal-infant bonding also investigate mode of delivery bias in their studies and adjust for this effect as needed. Our results also indicate that clinicians should be aware of peripartum life stressors that may impact the maternal-infant emotions, feelings, and relationship, so that interventions may be provided to improve health outcomes for mothers, infants, and families.

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**Table 2**  
Mother-to-infant bonding scale global score and items score, according to delivery mode.

Mean ± SD	VD n = 419	EICD n = 73	EmCD n = 81
MIBS global score	0.50 (± 1.05)	0.67 (± 1.14)	0.92 (± 1.50)*
Loving	0.038 (± 1.19)	0.050 (± 0.19)	0.06 (± 0.24)
Resentful	0.068 (± 0.38)	0.052 (± 0.20)	0.074 (± 0.30)
Neutral or felt nothing	0.049 (± 0.33)	0.081 (± 0.51)	0.089 (± 0.40)
Joyful	0.074 (± 0.26)	0.076 (± 0.31)	0.185 (± 0.39)**
Dislike	0.063 (± 0.25)	0.157 (± 0.34)	0.123 (± 0.36)
Protection	0.169 (± 0.41)	0.15 (± 0.33)	0.197 (± 0.40)
Disappointed	0.024 (± 0.16)	0.052 (± 0.20)*	0.148 (± 0.45)***
Aggressive	0.024 (± 0.19)	0.078 (± 0.26)	0.049 (± 0.21)

VD, vaginal delivery; EICD, elective cesarean delivery; EmCD, emergency cesarean delivery.

Data expressed as Mean ± Standard Deviation.

\* p < 0.001 vs VD.

\*\* p < 0.005 vs VD.

\*\*\* ^p < 0.008 vs VD.

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