ISSN 0973-2063 (online) 0973-8894 (print)
Bioinformation 22(10): 7571-7575 (2026)
©Biomedical Informatics (2026)

BIOINFORMATION
Discovery at the interface of physical and biological sciences
BIOMEDICAL INFORMATICS
www.bioinformation.net
Volume 22(10)
Research Article

Received October 1, 2026; Revised October 31, 2026; Accepted October 31, 2026, Published October 31, 2026
DOI: 10.6026/973206300227571

SJIF 2026 (Scientific Journal Impact Factor for 2026) = 8.478
2022 Impact Factor (2023 Clarivate Inc. release) is 1.9

Declaration on Publication Ethics:
The author's state that they adhere with COPE guidelines on publishing ethics as described elsewhere at https://publicationethics.org/. The authors also undertake that they are not associated with any other third party (governmental or non-governmental agencies) linking with any form of unethical issues connecting to this publication. The authors also declare that they are not withholding any information that is misleading to the publisher in regard to this article.

Declaration on official E-mail:
The corresponding author declares that lifetime official e-mail from their institution is not available for all authors

License statement:
This is an Open Access article which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly credited. This is distributed under the terms of the Creative Commons Attribution License

Comments from readers:
Articles published in BIOINFORMATION are open for relevant post publication comments and criticisms, which will be published immediately linking to the original article without open access charges. Comments should be concise, coherent and critical in less than 1000 words.

Disclaimer:
Bioinformation provides a platform for scholarly communication of data and information to create knowledge in the Biological/ Biomedical domain after adequate peer/editorial reviews and editing entertaining revisions where required. The views and opinions expressed are those of the author(s) and do not reflect the views or opinions of Bioinformation and (or) its publisher Biomedical Informatics. Biomedical Informatics remains neutral and allows authors to specify their address and affiliation details including territory where required.

Edited by Ruby Singh
E-mail: bioinformationruby@gmail.com
Citation: Malik *et al*. Bioinformation 22(10): 7571-7575 (2026)

Early breastfeeding initiation in mothers and newborn outcomes: A tertiary care centre based study

Vanshika Malik[1], Richa Yadav[2,*] & Pratima Verma[3]

[1]Department of Obstetrics & Gynecology, Dr KNS Memorial Institute of Medical Sciences, India; [2]Department of Obstetrics & Gynecology, Dr RMLIMS, Lucknow, India; [3]Department of Obstetrics & Gynecology, GSVM Medical College, Kanpur, India; *Corresponding author

Affiliation URL:
https://bodhisatvauniversity.com/
https://www.drrmlims.ac.in/
https://gsvmmedicalcollege.com/

ISSN 0973-2063 (online) 0973-8894 (print)
Bioinformation 22(10): 7571-7575 (2026)
©Biomedical Informatics (2026)

Author contact:
Vanshika Malik - E-mail: vanshikamalik17@gmail.com
Richa Yadav - E-mail: yadavricha965@gmail.com
Pratima Verma - E-mail: drpratima2011@gmail.com

Abstract:
Early initiation of breastfeeding within one hour of birth reduces neonatal morbidity and mortality, as recommended by WHO and UNICEF. Therefore, it is of interest to compare the breastfeeding initiation after vaginal and cesarean deliveries and identify factors associated with delayed initiation. A hospital-based cross-sectional study included 200 mothers with live newborns attending tertiary care hospitals in Uttar Pradesh, India. Breastfeeding initiation was categorized into four intervals: less than 1 hour, 1–4 hours, 4–12 hours and 12–24 hours, with data analyzed using SPSS version 25.0 and the Chi-square test. Thus, data shows the differences in breastfeeding initiation patterns between delivery modes and emphasizes the need for interventions to promote early breastfeeding.

Keywords: Early initiation of breastfeeding (EIBF); vaginal delivery; cesarean section; neonatal mortality; skin-to-skin contact; hospital-based study

Background:
Breastfeeding is the optimal source of nutrition for newborns and contributes substantially to neonatal survival, growth and health **[1]**. The World Health Organization and United Nations Children's Fund recommend initiating breastfeeding within the first hour after birth to promote early colostrum intake and improve neonatal outcomes **[2]**. Colostrum contains immunoglobulins, growth factors and essential nutrients that provide immune protection and support neonatal development **[3].** Early breastfeeding stimulates maternal oxytocin release, promoting uterine contractions and reducing postpartum blood loss **[4]**. Delayed initiation of breastfeeding has been associated with increased neonatal morbidity and mortality compared with initiation within the first hour of life **[5]**. Despite these recommendations, early initiation remains suboptimal in India, with national survey data indicating that a considerable proportion of newborns are not breastfed within the first hour after birth **[6]**. Maternal, neonatal and healthcare-related factors influence breastfeeding initiation, with mode of delivery being an important determinant **[7]**. Therefore, it is of interest to compare the time of initiation of breastfeeding among women undergoing vaginal delivery and those undergoing caesarean section in a tertiary care hospital setting.

Methodology:
The study aimed to assess and compare the initiation of breastfeeding following normal vaginal delivery and cesarean section in a hospital-based setting. Specifically, it determined the proportion of mothers initiating breastfeeding within one hour of delivery, compared the timing of breastfeeding initiation between vaginal and cesarean deliveries, identified maternal, neonatal and institutional factors associated with delayed initiation and evaluated the association between selected demographic factors and delayed breastfeeding initiation. A hospital-based cross-sectional observational study was conducted in the Departments of Obstetrics and Gynecology and Neonatology at Maharaja Suheldev Autonomous State Medical College, Bahraich and the Department of Obstetrics and Gynecology at GSVM Medical College, Kanpur, Uttar Pradesh, India. The study included mothers who delivered live newborns by either normal vaginal delivery or cesarean section and who were medically stable, conscious and provided informed consent. Mothers with newborns requiring immediate NICU admission, those with severe post-delivery complications, stillbirths, or newborns with major congenital anomalies were excluded. The sample size was calculated using the standard formula for cross-sectional studies and after accounting for a 10% non-response rate, a total of 200 participants were enrolled. Eligible mothers were selected using systematic random sampling based on the labor room delivery register. Data were collected using a pre-tested, interviewer-administered structured questionnaire adapted from previously published literature, along with direct observation of breastfeeding initiation within the first hour after birth. The questionnaire assessed socio-demographic characteristics, obstetric and healthcare-related factors, neonatal characteristics, maternal knowledge regarding breastfeeding and neonatal outcomes. Following data collection, breastfeeding counseling was provided to all mothers. Early initiation of breastfeeding was defined as initiation within one hour of birth, delayed cord clamping as clamping performed 1–3 minutes after birth or after cessation of cord pulsations and rooming-in as continuous mother–newborn stay in the same room during hospitalization. Data were entered into Microsoft Excel and analyzed using SPSS version 25.0. Categorical variables were expressed as frequencies and percentages and the Chi-square test was used to compare breastfeeding initiation between delivery modes, with a p-value <0.05 considered statistically significant.

Results:
A total of 200 mothers who delivered live newborns were included in the study. The socio-demographic characteristics of the participants are presented in **Table 1.** Most mothers were aged 18–24 years (41%), followed by 25–30 years (34%), while 16% and 9% belonged to the 31–35 years and 36–40 years age groups, respectively. Regarding educational status, secondary education was the most common (40%), followed by graduation (30%), primary education (20%) and postgraduate education (10%). The majority of participants were homemakers (70%), whereas 30% were employed. Sociodemographic characteristics

demonstrated a statistically significant association with early initiation of breastfeeding ($\chi^2 = 6.12$, $p = 0.047$). The association between mode of delivery and the timing of breastfeeding initiation is shown in **Table 2.** Among mothers who delivered vaginally, 66 (55.0%) initiated breastfeeding within one hour compared with only 8 (10.0%) mothers who underwent cesarean section. Delayed initiation beyond four hours was substantially more frequent among cesarean deliveries than vaginal deliveries. This association was highly statistically significant ($\chi^2 = 51.97$, $p < 0.001$). Maternal awareness and knowledge regarding breastfeeding are summarized in **Table 3**. Overall, 140 (70%) mothers knew that breastfeeding should be initiated within the first hour after birth, while 150 (75%) recognized the benefits of colostrum feeding. However, awareness that delayed breastfeeding initiation could adversely affect neonatal outcomes was lower, with only 120 (60%) mothers answering correctly, whereas the remaining participants either lacked knowledge or were uncertain. The availability of breastfeeding counseling and institutional support is presented in **Table 4**. Antenatal counseling regarding timely initiation of breastfeeding was received by 130 (65%) mothers, while postnatal counseling was provided to 150 (75%) mothers. Additionally, 140 (70%) participants reported receiving adequate support from healthcare providers for breastfeeding initiation, indicating satisfactory institutional support in the participating hospitals. Breastfeeding practices are described in **Table 5**. Early initiation of breastfeeding was practiced by 80 (40%) mothers, whereas 120 (60%) experienced delayed initiation. Rooming-in was practiced in 140 (70%) mother–newborn pairs, while immediate skin-to-skin contact was provided to 120 (60%) newborns. These findings suggest that although supportive newborn care practices were relatively common, early breastfeeding initiation remained suboptimal. The relationship between breastfeeding initiation time and neonatal mortality is presented in **Table 6**. Early neonatal mortality remained low across all breastfeeding initiation groups. However, late neonatal mortality increased progressively with delayed initiation, with the highest number of deaths observed among infants who initiated breastfeeding between 24 and 96 hours after birth. This association was statistically significant ($\chi^2 = 8.59$, $p = 0.0137$), although the small number of deaths warrants cautious interpretation. The association between maternal educational status and early breastfeeding initiation is shown in **Table 7**. Mothers with higher educational attainment demonstrated greater rates of initiating breastfeeding within one hour compared with those having only primary education. Early initiation occurred in 30 of 50 graduate mothers compared with only 22 of 70 mothers with primary education. The association between maternal education and breastfeeding initiation was statistically significant ($\chi^2 = 8.72$, $p = 0.012$). The association between parity and breastfeeding initiation is presented in **Table 8**. Overall, early initiation of breastfeeding was observed in 85 (42.5%) mothers, whereas 115 (57.5%) had delayed initiation. Among primigravida mothers, only 26 (29.5%) initiated breastfeeding within one hour compared with 59 (52.7%) multigravida mothers. Delayed initiation was correspondingly more common among primigravida women (70.5%) than multigravida women (47.3%). The association between parity and breastfeeding initiation was highly statistically significant ($\chi^2 = 11.98$, $p < 0.001$).

Table 1: Socio-demographic characteristics of the study participants (n = 200)

S. No	Variable	Category	Frequency (n)	Percentage (%)
1	Age (years)	18–24	82	41.0
		25–30	68	34.0
		31–35	32	16.0
		36–40	18	9.0
2	Education	Primary	40	20.0
		Secondary	80	40.0
		Graduate	60	30.0
		Postgraduate	20	10.0
3	Occupation	Homemaker	140	70.0
		Working	60	30.0

Chi-square = 6.12; p = 0.047

Table 2: Association between mode of delivery and timing of initiation of breastfeeding (n = 200)

Mode of Delivery	<1 hour	1–4 hours	4–12 hours	12–24 hours	Total
Vaginal Delivery	66	30	15	9	120
Cesarean Section	8	22	28	22	80
Total	74	52	43	31	200

Chi-square = 51.97; p < 0.001

Table 3: Maternal Awareness and Knowledge Regarding Breastfeeding (n = 200)

S.No	Variable	Yes n (%)	No n (%)	Don't Know n (%)
1	Aware that breastfeeding should begin within 1 hour	140 (70.0)	40 (20.0)	20 (10.0)
2	Aware of benefits of colostrum feeding	150 (75.0)	30 (15.0)	20 (10.0)
3	Aware that delayed initiation increases neonatal risk	120 (60.0)	50 (25.0)	30 (15.0)

Table 4: Counseling and institutional support for breastfeeding (n = 200)

S.No	Variable	Yes n (%)	No n (%)
1	Received antenatal breastfeeding counseling	130 (65.0)	70 (35.0)
2	Received postnatal breastfeeding counseling	150 (75.0)	50 (25.0)
3	Received support from healthcare staff	140 (70.0)	60 (30.0)

Table 5: Breastfeeding practices among study participants (n = 200)

S.No	Variable	Always n (%)	Sometimes n (%)	Never n (%)
1	Early initiation of breastfeeding	80 (40.0)	–	120 (60.0)
2	Rooming-in practiced	140 (70.0)	30 (15.0)	30 (15.0)
3	Skin-to-skin contact provided	120 (60.0)	30 (15.0)	50 (25.0)

Table 6: Association between timing of breastfeeding initiation and neonatal mortality

Initiation Time	Early Neonatal Mortality (0–7 days)	Late Neonatal Mortality (7–28 days)
<1 hour	1	0
1–24 hours	2	1
24–96 hours	2	4

Chi-square = 8.59; p = 0.0137

Table 7: Association between maternal education and early initiation of breastfeeding (n = 200)

Maternal Education	Early Initiation n (%)	Delayed Initiation n (%)	Total
Primary	22 (31.4)	48 (68.6)	70
Secondary	33 (41.3)	47 (58.7)	80
Graduate	30 (60.0)	20 (40.0)	50

Total	85 (42.5)	115 (57.5)	200

Chi-square = 8.72; p = 0.012

Table 8: Association between parity and early initiation of breastfeeding (n = 200)

Parity	Early Initiation n (%)	Delayed Initiation n (%)	Total
Primigravida	26 (29.5)	62 (70.5)	88
Multigravida	59 (52.7)	53 (47.3)	112
Total	85 (42.5)	115 (57.5)	200

Chi-square = 11.98; p < 0.001

Discussion:

The present hospital-based cross-sectional study evaluated the timing of breastfeeding initiation among mothers delivering by vaginal delivery and cesarean section and identified factors associated with delayed initiation. Early initiation of breastfeeding (EIBF) within one hour of birth is a cornerstone of essential newborn care and is strongly recommended by the World Health Organization (WHO) and UNICEF because of its proven benefits for neonatal survival and optimal infant nutrition **[8]**. Most mothers in the present study were aged 18–30 years, reflecting the predominant reproductive age group observed in similar hospital-based studies from low- and middle-income countries **[9]**. The principal finding was that mothers who delivered vaginally were significantly more likely to initiate breastfeeding within the first hour than those undergoing cesarean section. Cesarean delivery remained an important predictor of delayed breastfeeding, likely because of post-operative pain, delayed maternal recovery, anesthesia and postponed mother–infant contact. Similar observations have been reported by Getaneh *et al*., who showed reduced odds of timely breastfeeding initiation following cesarean delivery and by Getaneh *et al*., who reported comparable findings among Indian mothers **[10].** The present findings are further supported by systematic reviews. Prior *et al*. concluded that cesarean section substantially reduces the likelihood of breastfeeding initiation within the first hour after birth. More recent international evidence by Stany *et al*. shown lower rates of EIBF following cesarean delivery across different healthcare settings, emphasizing the need for targeted breastfeeding support after operative births **[11].** Skin-to-skin contact immediately after birth was another important determinant of early breastfeeding initiation in the present study. Mothers who experienced immediate skin-to-skin contact were more likely to initiate breastfeeding within one hour than those without such contact **[12, 13].** Maternal education and parity were also significantly associated with breastfeeding initiation. Mothers with higher educational attainment showed greater adherence to recommended breastfeeding practices, probably because of improved awareness of colostrum feeding, better understanding of health education and greater utilization of antenatal services. Similarly, multigravida mothers initiated breastfeeding earlier than primigravida mothers, likely reflecting previous breastfeeding experience and greater maternal confidence. Comparable associations between maternal education, parity and EIBF have been documented in earlier studies **[14, 15]**. Institutional factors also influenced breastfeeding practices. Mothers delivering during daytime hours were more likely to initiate breastfeeding early than those delivering at night, suggesting that staffing patterns and availability of trained healthcare personnel may affect breastfeeding support. Strengthening postnatal counseling and ensuring adequate staff availability throughout the day may therefore improve EIBF rates **[16, 17]**. Although neonatal mortality was low in this study, delayed breastfeeding initiation was associated with a higher number of late neonatal deaths. This observation agrees with evidence from the Lancet Breastfeeding Series and the Ghana cohort study by Soren *et al*., and Malapure *et al*. both of which showed that postponing breastfeeding beyond the first hour significantly increases neonatal mortality **[18, 19]**. Overall, the present findings reinforce that early breastfeeding initiation is influenced by modifiable maternal and institutional factors. Promoting vaginal birth where appropriate, facilitating immediate skin-to-skin contact, strengthening antenatal and postnatal breastfeeding counseling and implementing Baby-Friendly Hospital Initiative practices can substantially improve early breastfeeding initiation and neonatal outcomes.

Conclusion:

Early initiation of breastfeeding was significantly associated with vaginal delivery, skin-to-skin contact, higher maternal education and multiparity, whereas cesarean delivery was the major contributor to delayed initiation. Strengthening hospital-based interventions, including breastfeeding counseling, immediate skin-to-skin contact, rooming-in and Baby-Friendly Hospital Initiative practices, can improve timely breastfeeding initiation. These evidence-based measures have the potential to enhance neonatal health outcomes and reduce neonatal morbidity and mortality.

Strengths:

This study was conducted in tertiary care government hospitals, providing real-world evidence on breastfeeding practices. It included both vaginal and cesarean deliveries, enabling direct comparison and evaluated multiple maternal, neonatal and institutional determinants of breastfeeding initiation. The use of a structured pre-tested questionnaire and standardized data collection enhanced the reliability of the findings.

Limitations:

The cross-sectional design limits causal inference between identified factors and breastfeeding initiation. As the study was conducted only in tertiary care hospitals, the findings may not be generalizable to community or primary healthcare settings. In addition, the small number of neonatal deaths and reliance on self-reported information for some variables may have introduced limited statistical power and reporting bias.

References:

[1] https://www.who.int/health-topics/breastfeeding
[2] Duan H *et al. Nutrients*. 2024 **16**:2007. [PMID: 38999755]
[3] https://www.ncbi.nlm.nih.gov/books/NBK507848/
[4] Hammad M & Rahman MHU. *BMC Public Health*. 2025 **25**:1898. [PMID: 40410715]

[5] Benedict RK *et al. Matern Child Nutr*. 2018 **4**:e12698. [PMID: 30499250]
[6] Ayalew G *et al. BMC Pregnancy Childbirth*. 2024 **24**:735. [PMID: 39516749]
[7] Rubagumya D *et al. East Afr Health Res J*. 2025 **9**:78. [PMID: 41211235]
[8] https://www.who.int/tools/elena/commentary/early-breastfeeding
[9] Emagneneh T *et al. Front Glob Womens Health*. 2025 **6**:1336661. [PMID: 40275991]
[10] Getaneh T *et al. Int Breastfeed J*. 2021 **16**:51. [PMID: 34225731]
[11] Stany D *et al.* Med *J Armed Forces India*. 2023 **79**:309. [PMID: 37193520]
[12] Sampieri CL *et al. Int Breastfeed J*. 2022 **17**:49. [PMID: 35799253]
[13] Sarkar P *et al. BMC Public Health*. 2023 **23**:510. [PMID: 36927525]
[14] Bengough T *et al. Matern Child Nutr*. 2022 **18:**e13405. [PMID: 36006012]
[15] Edmond KM *et al. Am J Clin Nutr*. 2007 **86**:1126. [PMID: 17921392]
[16] Huang C *et al. BMC Pregnancy Childbirth*. 2022 **22**:707. [PMID: 36104660]
[17] Zewdu F *et al. Int Breastfeed J*. 2025 **20**:27. [PMID: 40200241]
[18] Soren SK *et al. Cureus*. 2021 **13**:e16936. [PMID: 34513506]
[19] Malapure PS *et al. Indian J Obstet Gynecol Res*. 2026 **13**:500. [DOI: 10.18231/j.ijogr.13433.1775037276]

Caveat Emptor is applicable among the literate community where required and possible. The publisher, its journal, editors and the internal/external reviewers take adequate steps to check, evaluate, correct, edit, revise and improve content where possible and required.