EVALUATING THE INDICATIONS FOR PRIMARY CESAREAN SECTION AT HA DONG GENERAL HOSPITAL

Vu Dinh Nam[1*], Dang Thi Minh Nguyet[2], Dao Thi Hoa[3]

[1]*Department of Obstetrics and Gynecology, Faculty of Medicine, Dai Nam University*
[2]*Department of Obstetrics and Gynecology, Hanoi Medical University*
[3]*Central Obstetrics and Gynecology Hospital*

Received: 05/03/2026
Revised: 16/04/2026; Accepted: 18/05/2026

ABSTRACT

Objective: To evaluate the indications for primary cesarean section at Ha Dong General Hospital in 2024.

Subject and method: A cross-sectional descriptive study was conducted on 572 pregnant women with a gestational age ≥ 28 weeks and no prior uterine scar who underwent their first cesarean section at Ha Dong General Hospital from January 2024 to December 2024.

Results: The hospital's cesarean section rate was 54.7%, with primary cesarean sections accounting for 28.1% of total births. Fetal causes were the most common indication (59,3%), primarily due to fetal distress (64,6% in nulliparous and 35.4% in multiparous women). Abnormal labor accounted for 18,0%, with fully dilated cervix but non-engaged head being the main cause, particularly in 62,2% of nulliparous cases. Maternal causes accounted for 9,1%, while adnexal causes represented 7.0%. Social factors (6,6%) were mainly related to infertility/IVF. Regarding clinical characteristics, 80,0% of cases were between 37 and 40 weeks of gestation, 83,2% were in the latent phase of labor, and 61,9% were nulliparous.

Conclusion: Indications for primary cesarean section at Ha Dong General Hospital in 2024 were primarily driven by fetal factors, especially fetal distress, and abnormalities in labor progression. Surgical decisions were frequently based on a combination of multiple clinical indications and were mostly performed during the latent phase of labor in full-term pregnancies.

Keywords: Primary cesarean section; Indications for cesarean section; Fetal distress; Abnormal labor; Ha Dong General Hospital.

1. INTRODUCTION

A Cesarean section (CS) is a surgical procedure to deliver the fetus and its appendages from the uterus through incisions in the abdominal wall and the uterus[1]. As a common obstetric surgery, it is indicated to ensure the safety of both mother and neonate in cases of dystocia or when vaginal delivery is contraindicated for various clinical reasons. CS is considered a lifesaving intervention in emergency situations such as placenta previa, umbilical cord prolapses, or acute fetal distress. However, CS remains a major surgery associated with inherent risks, including infection, postpartum hemorrhage, and thromboembolic events [2] . Notably, the consequences of a primary cesarean section extend to subsequent pregnancies, increasing the rates of repeat CS, postpartum infection, placenta previa, placenta accreta spectrum, cesarean scar pregnancy, uterine rupture, postoperative bowel adhesion, and overall delivery cost - placing significant pressure on the reproductive healthcare system.

In recent decades, cesarean section rates have rapidly increased globally and within Vietnam. This trend stems not only from pathological factors but also from shifts in clinical practice, medicolegal pressures, and maternal requests. The World Health Organization (WHO) emphasizes that when CS rates exceed the 10-15% threshold, the benefits in reducing maternal and neonatal mortality no longer outweigh the risks associated with the surgery [3],[4]. Consequently, controlling and optimizing the indications for cesarean section, particularly for primary cases, has become a top priority in obstetric quality management.

Ha Dong General Hospital is a Grade I multidisciplinary medical facility, serving as a hub for receiving and managing complex obstetric cases at the gateway of the capital. With a high patient volume and its role as a specialized treatment center, surveying the current status of cesarean sections at this facility not only reflects contemporary clinical intervention trends but also provides essential data for quality management. Therefore, to provide scientific evidence for standardizing clinical decision-making processes and enhancing safety in obstetric care, we conducted this study with the objective: To evaluate the indications for primary cesarean section at Ha Dong General Hospital in 2024.

2. MATERIALS AND METHODS

2.1. Participants

The study population comprised 572 pregnant women who underwent their first (primary) cesarean section (CS) at Ha Dong General Hospital from January 1, 2024, to December 31, 2024.

2.1.1. Inclusion criteria

Study participants were selected based on specific inclusion criteria: pregnant women with a live fetus and a confirmed gestational age of at least 28 weeks; individuals who were either nulliparous or multiparous

*Corresponding author
Email: Khatuyds@gmail.com **Phone:** (+84) 978785698 **Https:**//doi.org/10.52163/yhc.v67iE1.5105

with no history of prior uterine scarring; and availability of comprehensive medical records detailing clinical, paraclinical, and labor progression data.

2.1.2. Exclusion criteria

We excluded patients who were indicated for CS at other medical facilities and subsequently referred to the hospital for surgery, as well as those with incomplete medical records missing essential variables required for the study objectives.

2.2. Study design

2.2.1. Study design: This research was conducted using a cross-sectional descriptive study design to evaluate and analyze the clinical indications for primary cesarean sections.

2.2.2. Sample size and sampling method: The sample size was determined using the standardized formula for estimating a single proportion:

$$n = Z^2_{1-\alpha/2} \frac{p(1-p)}{d^2}$$

In which:

+ n is the required sample size.

+ p is the estimated proportion of primary cesarean sections, based on a previous study at Bach Mai Hospital, with p = 0.3913 [5] .

+ d is the desired margin of error between the sample estimate and the population parameter, set at 0.04.

+ α is the significance level, set at 0.05, which corresponds to $Z_{1-\alpha/2}$ = 1,96.

From this, the minimum required sample size was calculated to be 572 patients. We employed a systematic sampling technique with a sampling interval of k = 3 to select participants from the hospital's database, ensuring a representative sample of 572 women who met all inclusion criteria.

2.3. Statistical methods

Data were cleaned, coded, and entered using Epidata software and subsequently analyzed using SPSS 26.0. Descriptive statistics, including frequencies and percentages, were used to describe the study population and the prevalence of CS indications. Inferential statistics were applied to compare variables, with a p-value of < 0.05 considered to indicate statistical significance.

2.4. Data collection process

A standardized data collection form was utilized to systematically extract information from archived medical records. The process focused on key groups of variables: maternal characteristics (age, history), obstetric features (gestational age, labor phase), and the specific clinical indications for CS, which were classified into maternal factors, fetal factors, abnormal labor progression, adnexal factors, and social factors.

2.5. Ethical considerations

The study protocol was approved by the Scientific Committee and the Institutional Review Board for Biomedical Research under Decision No. 178/VKIM-HĐĐĐ. All collected data were kept strictly confidential and used solely for research purposes. Patient information was fully anonymized during the analysis and reporting stages to ensure ethical standards were maintained.

3. RESULTS

In 2024, Ha Dong General Hospital recorded a total of 7,012 deliveries, including 3,837 cesarean sections (54.7%). Among these, primary cesarean sections accounted for 1,968 cases, representing 28.1% of the total births. Our study, conducted on 572 medical records, yielded the following results:

Table 1. General characteristics of the study participants

Characteristics	Nulliparous (n = 354)		Multiparous (n = 218)		Total (N = 572)		p-value
	n	%	n	%	n	%	
1. Maternal age (years)							
< 20	31	75,6	10	24,4	41	7,2	< 0,001*
20 - 35	299	64,9	162	35,1	461	80,6	
≥ 35	24	34,3	46	65,7	70	12,2	
Mean age	26,7 ± 5,3		29,6 ± 6,3		27,8 ± 5,8		
Age range (Min - Max)	15 - 45		17 - 46		15 - 46		
2. Maternal medical conditions							
Present	26	63,4	15	36,6	41	7,2	0,838
Absent	328	61,8	203	38,2	531	92,8	
3. Mode of conception							
Natural	342	61,8	211	38,2	553	96,7	0,901
ART	12	63,2	7	36,8	19	3,3	
4. Type of Surgery							
Emergency CS	231	66,2	118	33,8	349	61,1	0,009*
Elective CS	123	55,2	100	44,8	223	38,9	

The mean age of the pregnant women undergoing primary cesarean section in this study was 27.8 ± 5.8 years. Primary CS in nulliparous women was mainly concentrated among those of reproductive age, while in multiparous women, it was more prevalent in those aged over 35 years; this difference was statistically significant with p < 0.001. The rate of pregnancies resulting from Assisted Reproductive Technology (ART) accounted for 3.1%. Emergency cesarean sections represented 61.1% of the total cases.

Table 2. Labor status at the time of surgery

Characteristics	Nulliparous (n = 354)		Multiparous (n = 218)		Total (N = 572)		p-value
	N	%	n	%	n	%	
1. Gestational age							
28 - 32 weeks	4	50,0	4	50,0	8	1,4	0,298
32 - 37 weeks	16	76,2	5	23,8	21	3,7	
37 - 40 weeks	283	61,8	175	38,2	458	80,0	
> 40 weeks	51	60,0	34	40,0	85	14,9	
2. Labor phase							
Not in labor	11	39,3	17	60,7	28	4,9	0,024*
Latent phase	299	63,2	174	36,8	473	83,2	
Active phase	44	64,7	24	35,3	68	11,9	
3. Amniotic fluid volume							
Normal	338	62,4	204	37,6	542	94,8	0,154
Oligohydramnios	15	57,7	11	42,3	26	4,5	
Polyhydramnios	1	25,0	3	75,0	4	0,7	
4. Status of membranes							
Intact	78	53,1	69	46,9	147	25,7	0,006*
Ruptured	273	65,5	144	34,5	417	72,9	
Leaking	3	37,5	5	62,5	8	1,4	
5. Amniotic fluid color							
Milky white / Turbid	55	58,5	39	41,5	94	16,4	0,143
Meconium-stained	221	66,8	110	33,2	331	83,6	

The majority of primary cesarean sections were performed in term pregnancies, accounting for 94.9%, with post-term pregnancies (>40 weeks) representing 14.9%. Regarding the phase of labor, the latent phase was overwhelmingly predominant, accounting for 83.2% of cases, while the active phase represented only 11.9%. A statistically significant difference in the labor phase was observed between nulliparous and multiparous women (p = 0.024).

Most participants had ruptured or leaking membranes at the time of surgery (74.3%), with a remarkably high prevalence of meconium-stained or foul-smelling amniotic fluid (83.6%). There was a significant difference in the status of the membranes between the nulliparous and multiparous groups regarding the indication for cesarean section (p = 0.006).

Table 3. Indications for primary cesarean section

Indications		Nulliparous (n = 354)		Multiparous (n = 218)		Total (N = 572)
		n	%	N	%	
1. Maternal Causes	Preeclampsia (TSG)	10	66,7	5	33,3	15
	Hypertension (THA)	2	25,0	6	75,0	8
	Diabetes Mellitus	3	75,0	1	25,0	4
	Graves' Disease	0	0	1	100	1
	Cardiac Disease	2	50,0	2	50,0	4
	Renal Disease	1	50,0	1	50,0	2
	Pulmonary Disease	0	0,0	1	100	1

Indications		Nulliparous (n = 354)		Multiparous (n = 218)		Total (N = 572)
		n	%	N	%	
1. Maternal Causes	Cephalopelvic Disproportion	12	70,6	5	29,4	17
	Total	30	57,7	22	42,3	52 (9,1%)
2. Fetal Causes	Fetal Macrosomia	14	34,2	27	65,8	41
	Fetal Distress	155	64,6	85	35,4	240
	Abnormal Presentation	27	56,3	21	43,7	48
	Multiple Gestation	7	70,0	3	30,0	10
	Total	203	59,9	136	40,1	339 (59,3%)
3. Abnormal Labor Progression	Failure to Progress	46	77,9	13	22,1	59
	Uterine Hyperstimulation	5	71,4	2	28,6	7
	Arrest of Descent at Full Dilation	23	62,2	14	37,8	37
	Total	74	71,8	29	28,2	103 (18,0%)
4. Adnexal Causes	Placental Abruption	1	50,0	1	50,0	2
	Placenta Previa	1	20,0	4	80,0	5
	Umbilical Cord Prolapse	2	50,0	2	50,0	4
	Oligohydramnios	17	58,6	12	41,4	29
	Total	21	52,5	19	47,5	40 (7,0%)
5. Social Factors	Infertility/Subfertility	12	63,2	7	36,8	19
	Advanced Maternal Age in Nulliparity	7	100	0	0,0	7
	Poor Obstetric History/ Maternal Request	7	58,3	5	41,7	12
	Total	26	68,4	12	31,6	38 (6,6%)
Total		354	61,9	218	38,1	572 (100%)

Fetal causes were the most common category of indications, accounting for 59.3%. This was followed by abnormal labor progression (18.0%) and maternal causes (9.1%). Within the fetal causes group, fetal distress had the highest prevalence (39.3%), particularly in nulliparous women (64.6% compared to 35.4% in multiparous women).

Indications related to adnexal factors (7.0%) and social factors (6.6%) accounted for the lowest proportions in this study.

Table 4. Distribution of indications for primary cesarean section

Number of Indications						
Nulliparous (n = 354)		Multiparous (n = 218)		Total (N = 572)		p-value
n	%	n	%	n	%	
Single indication						0,704
37	59,7	25	40,3	62	10,8	
≥ 2 indications						
317	62,2	193	37,8	510	89,2	

The majority of cesarean sections involved a combination of two or more indications, accounting for 89.2%. Only 10.8% of cases were performed based on a single indication. The rate of having two or more co-existing indications was higher in the nulliparous group (62.2%) compared to the multiparous group (37.8%). However, the difference in the number of combined indications between these two groups was not statistically significant (p > 0.05).

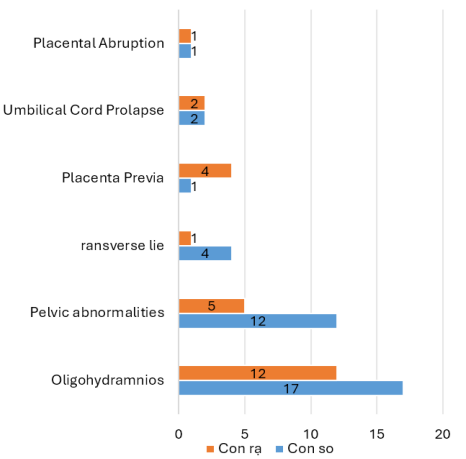

Figure 1. Cases with a single indication for cesarean section

Among the 62 cases where a cesarean section was performed based on a single indication, oligohydramnios was the most frequent cause,

accounting for 46.8%. This was followed by cephalopelvic disproportion (CPD) due to a contracted or asymmetrical pelvis at 27.4%. Emergency causes, such as umbilical cord prolapse or placental abruption, occurred at the lowest frequencies; however, they represented absolute solitary indications recorded in our study.

4. DISCUSSION

The findings of this study underscore a significant paradigm shift in obstetric management at Ha Dong General Hospital, where the cumulative cesarean section (CS) rate reached 54.7%, with primary CS accounting for 28.1% of total births. This prevalence markedly deviates from the World Health Organization's (WHO) evidence-based recommendation of 10-15%, indicating an intensified medicalization of childbirth within tertiary healthcare settings [1]. This trend transcends local clinical observation, representing a systemic phenomenon observed in rapidly transitioning healthcare systems such as China, where primary CS rates in high-level facilities frequently fluctuate between 25 - 30% [6] . From a public health perspective, the escalation of primary CS constitutes a critical longitudinal risk; it establishes a surgical predisposition that substantially increases the morbidity of subsequent pregnancies, specifically regarding the incidence of placenta accreta spectrum, uterine rupture, and severe obstetric hemorrhage [2] .

A comprehensive evaluation of indications identifies fetal-related factors predominantly acute fetal distress as the primary determinant (59.3%). A critical point of clinical discourse is that 83.2% of these interventions were performed during the latent phase of labor, often precipitated by the presence of meconium stained amniotic fluid (83.6%). Modern obstetric frameworks, particularly those established by the American College of Obstetricians and Gynecologists (ACOG), assert that isolated meconium, in the absence of concurrent electronic fetal monitoring (EFM) abnormalities, is an insufficient predictor of neonatal compromise [7] . The high intervention frequency at this early stage suggests a potential over-diagnosis of fetal distress, driven by a hyper-cautious clinical environment that prioritizes immediate surgical resolution over expectant management, even when fetal physiological reserves remain intact [8] .

Furthermore, labor abnormalities specifically arrest of dilatation or non-engaged head in nulliparous women (62.2%) underscore a misalignment with contemporary physiological labor standards. Global longitudinal data from Zhang et al. demonstrate that the active phase of labor often commences significantly later than historically perceived (at 6 cm dilation), and the premature diagnosis of dystocia remains a leading cause of avoidable primary CS globally [9] . In this study, the observation that 89.2% of cases involved a combination of multiple indications reflects a cumulative risk assessment model. This approach is frequently characteristic of defensive medical practice, where clinicians opt for surgical intervention to mitigate perceived medico-legal vulnerabilities rather than strictly adhering to physiological necessity. In the current socio-legal climate, the pressure to ensure an optimal neonatal outcome often overshadows the long-term maternal surgical risks [10] .

The socio-demographic transition also plays a pivotal role in shaping surgical thresholds. The rising prevalence of advanced maternal age and the utilization of Assisted Reproductive Technology (ART) have redefined the clinical and social value of pregnancy. In obstetric cultures influenced by the precious baby syndrome, as seen in Brazil and Italy, both healthcare providers and patients often perceive CS as a risk-averse, controlled delivery pathway [11] . Maternal request, although direct in only 6.6% of cases, exerts a secondary influence on clinical decision-making thresholds. Addressing this trajectory requires a multi-dimensional public health strategy: standardizing diagnostic criteria for fetal distress, re-evaluating labor progression protocols in accordance with modern physiological evidence and enhancing prenatal counseling to normalize low-risk vaginal birth. Failure to decelerate the rise in primary CS will lead to an irreversible surge in high-risk repeat cesareans, ultimately straining the capacity of the obstetric healthcare infrastructure [12] .

5. CONCLUSIONS

Through a study of 572 primiparous women undergoing their first Cesarean Section (CS) at Ha Dong General Hospital from January 2024 to December 2024, we have reached the following conclusions:

Indications for primary CS at the hospital are highly diverse, with fetal-related causes- particularly acute fetal distress and abnormal labor- playing a predominant role. The surgical decision is frequently the result of a combination of multiple indications rather than a single isolated factor, reflecting the clinician's caution in ensuring the safety of both mother and fetus.

The high rate of CS performed during the latent phase underscores the need to enhance labor monitoring capacity, while simultaneously standardizing diagnostic protocols for signs of fetal distress and effectively managing risk factors from the early stages. Optimizing primary CS indications is the key to improving the quality of obstetric care and minimizing long-term reproductive tract complications for women of childbearing age.

ACKNOWLEDGEMENT

Author Vu Dinh Nam was sponsored by the Vingroup Innovation Fund (VINIF) domestic master's and doctoral scholarship program, code VINIF.2024.ThS.77.

REFERENCES

[1] Sung S, Mikes BA, Martingano DJ. Cesarean Section. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 [cited 2025 Jan 15]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK546707/

[2] Guner G, Karabudak CB. Caesarean section rates and indications: a cross-sectional study from a tertiary care centre in Türkiye. BMC Pregnancy Childbirth 2025 Nov; 26(1):1..

[3] World Health Organization. World Health Organization. 2015. WHO Statement on Caesarean Section Rates. Frequently Asked Questions. Available at: https://www.who.int/news-room/questions-and-answers/item/who-statement-on-caesarean-section-rates-frequently-asked-questions

[4] World Health Organization. WHO Statement on Caesarean Section Rates [Internet]. Geneva; 2015. Available at: https://www.who.int/publications/i/item/WHO-RHR-15.02

[5] Bang NT, Nga VTQ, Tin DM. Comments and evaluation of primary cesarean section results at Bach Mai Hospital in 2022 [Vietnamese]. J Vietnam Med. 2024;543(1):181–6.

[6] Li HT, Luo S, Trasande L, Hellerstein S, Kang C, Li JX, et al. Geographic Variations and Temporal Trends in Cesarean Delivery Rates in China, 2008-2014. JAMA. 2017;317(1):69–76. DOI: 10.1001/jama.2016.18663.

[7] Caughey AB, Cahill AG, Guise JM, Rouse DJ. Safe prevention of the primary cesarean delivery. Am J Obstet Gynecol. 2014;210(3):179–93. DOI: 10.1016/j.ajog.2014.01.026.

[8] Brazier E, Borrell LN, Huynh M, Kelly EA, Nash D. Impact of new labor management guidelines on Cesarean rates among low-risk births at New York City hospitals: A controlled interrupted time series analysis. Ann Epidemiol. 2023;79:3–9. DOI: 10.1016/j.annepidem.2023.01.003.

[9] Zhang J, Landy HJ, Ware Branch D, Burkman R, Haberman S, Gregory KD, et al. Contemporary patterns of spontaneous labor with normal neonatal outcomes. Obstet Gynecol. 2010;116(6):1281–7. DOI: 10.1097/AOG.0b013e3181fdef6e.

[10] Vogel JP, Betrán AP, Vindevoghel N, Souza JP, Torloni MR, Zhang J, et al. Use of the Robson classification to assess caesarean section trends in 21 countries: a secondary analysis of two WHO multicountry surveys. Lancet Glob Health. 2015;3(5):e260-70. DOI: 10.1016/S2214-109X(15)70094-X.

[11] Boerma T, Ronsmans C, Melesse DY, Barros AJD, Barros FC, Juan L, et al. Global epidemiology of use of and disparities in caesarean sections. Lancet. 2018;392(10155):1341–8. DOI: 10.1016/S0140-6736(18)31928-7.

[12] Keag OE, Norman JE, Stock SJ. Long-term risks and benefits associated with cesarean delivery for mother, baby, and subsequent pregnancies: Systematic review and meta-analysis. PLoS Med. 2018;15(1):e1002494. DOI: 10.1371/journal.pmed.1002494.