

Original research article.

National Confidential Enquiry into Patient Outcome and Death (NCEPOD) classification for Urgency of Caesarean Section: A Prospective Observational Study

Abstract:

Background- The conventional binary classification of caesarean section categorizes planned operations as 'elective' and all other caesarean indications as 'emergencies'. These definitions are imprecise as all non-elective cases are labelled as emergencies, although some are distinctly more urgent than others. National Confidential Enquiry into Patient Outcome and Death (NCEPOD) classification is used to classify surgical procedures based on the urgency as emergency/urgent/scheduled and elective. It is a simple, valid, reliable classification which can be used across health care units. The recent 2024 NICE guidelines endorse the nomenclature of indications as: Emergency, Urgent, Scheduled and Elective as per the Decision to Delivery interval [DDI]. This classification will help in addressing the challenges encountered during the DDI, assessing the urgency of the indication and retrospective audit of outcomes.

Aims & Objectives- this study aims to classify caesarean sections according to the urgency using the NCEPOD classification.

Methodology- A prospective observational study was done on all women undergoing Caesarean sections in a tertiary care teaching hospital. The details pertaining to indication, classification of the indications according to the older binary classification and the study classification was done as per the DDI. The indications were tabulated and compared. The reasons for delay if any were studied.

Results- As per the binary classification, our study showed 19.8% elective cases & 80.19% emergency cases. After following the NCEPOD classification, the indications were reclassified into Emergency cases- 34.9%, Urgent cases- 21%, Scheduled cases- 13.7% & Elective cases- 30.27%. There was a striking difference in the classification of indications under the 'Emergency' category.

Conclusion- Classification of caesarean deliveries as per the DDI will help in better triage of the patients. Using the binary classification large chunk of patients are classified as emergency. DDI provides insights into indications for the real urgency and emergency nature of the indication. It is strongly recommended to classify the indications of caesarean section as; Emergency, Urgent, Scheduled and Elective as per the DDI.

Keywords: NCEPOD, DDI, caesarean, Emergency

## **Introduction:**

The conventional binary classification of caesarean section categorizes planned operations as 'elective' and all other indications as 'emergencies'<sup>1</sup>. Most obstetrics unit tend to follow the conventional classification. Indications under the heading 'Emergency' does not give a correct idea as to how 'urgent' was the indication based on the threat to the foetus and mother. These definitions are imprecise as all non-elective cases are labelled en bloc as emergencies, although some are distinctly more urgent than others. The continued use of this classification curtails the practicality of the information collected on obstetric audits. This is because the spectrum of urgency that occurs in obstetrics is lost within a single 'emergency' category.<sup>1,2</sup>

National Confidential Enquiry into Patient Outcome and Death (NCEPOD) classification is used to classify surgical procedures based on the urgency as emergency/urgent/scheduled and elective.

The NCEPOD classification can be applied to caesarean section to identify the urgency of the procedure. Decision-to-delivery interval (DDI) is a parameter which has been proposed by Royal College of Obstetricians and Gynaecologists (RCOG)<sup>3</sup> and National Institute for Health and Care Excellence (NICE-2021)<sup>4</sup> to define the urgency of the caesarean section. Decision to Delivery Interval [DDI] is used as a marker to classify the caesarean indications. Once decision of caesarean section has been made, the urgency must be decided as per risk to baby and safety of the mother.<sup>5,6</sup>

### **Caesarean section can hence be classified as per the DDI as:**

- **Emergency:** immediate threat to life of woman or foetus. DDI of 30 minutes.
- **Urgent:** Maternal or foetal compromise that is not immediately life-threatening. DDI of 30 min to 2 hours
- **Scheduled:** Needing early delivery but no maternal and foetal compromise. DDI 2 hour to 24 hours
- **Elective:** At a time to suit the woman and maternity team. DDI more than 24 hours.

NCEPOD classification of caesarean section is a simple, valid, reliable classification which can be used across health care units<sup>6</sup>. This study was conducted with an aim to re-classify the caesarean sections as per the DDI and compare the same with the conventional binary classification. This study will help in addressing the challenges encountered during the DDI,

assessing the urgency of the indication and retrospective audit of outcomes. The study also had a secondary objective to analyse various indications under the heading of emergency urgent, scheduled and elective. Delay if any in the DDI were also studied.

## Materials and Methods

A prospective observational study was conducted in the department of High-Risk Pregnancy & Critical Care in Obstetrics a sub-specialty of Obstetrics and Gynaecology at, Bharati Hospital affiliated to Bharati Vidyapeeth [Deemed to be University] Medical College, Pune over a period of 1 year (1<sup>st</sup> September 2023 to 31<sup>st</sup> August 2024) after obtaining institutional ethics committee approval.

All the women undergoing Caesarean section were included in the study. The indications of caesarean section were classified as per the conventional binary classification [Elective and Emergency] and the indications were re-classified as per the DDI [Emergency, Urgent, Scheduled and Elective].

Any delay in the DDI was also studied as a secondary outcome.

Descriptive statistics [frequency (%)] were used to depict characteristics of the participants. SPSS 29 was used to analyse the data. The difference in the classification was tabulated and analysed with the help of pie charts.

## Results:

A total of 1942 women delivered in our institute during the study period of one year. Total of 1146 women underwent a caesarean section [CS] with a rate of caesarean section at 59.01%. The CS rate is attributed to a high number of high risk mothers being referred to our tertiary care teaching hospital for maternal and foetal intensive care monitoring.

Figure 1 depicts the classification of indications as per the binary classification as Elective 19.8% (227/1146) and Emergency 80.19% (919/1146).

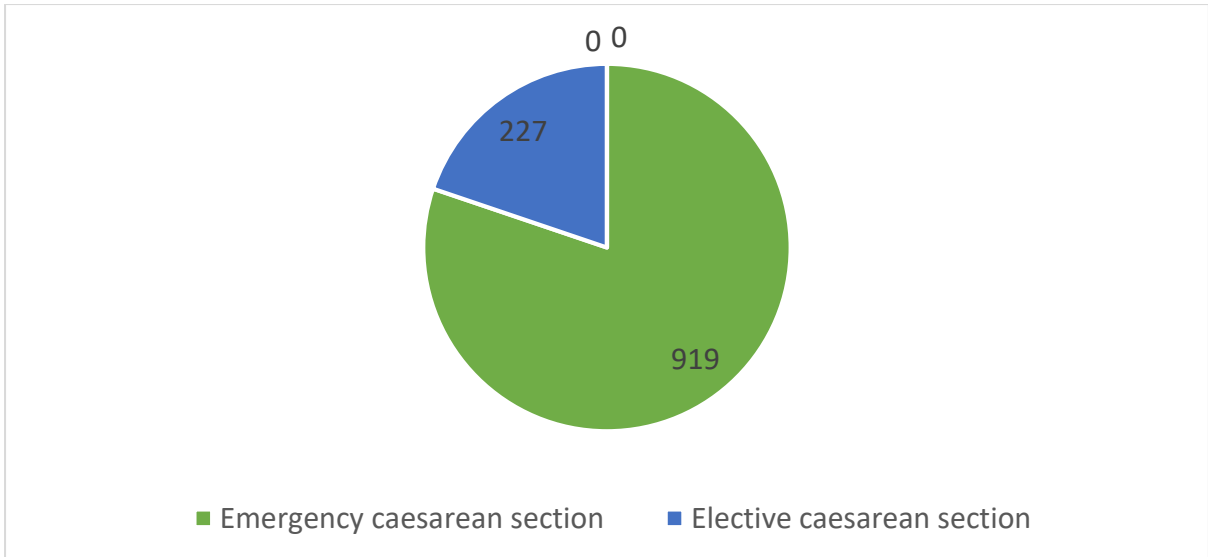


Figure1 Caesarean deliveries as per binary classifications

After application of the DDI classification we observed 400 (34.9%) emergency cases, 241 (21%) urgent cases, 158 (13.7%) scheduled cases and 347 (30.27%) elective cases. This has been demonstrated in figure2.

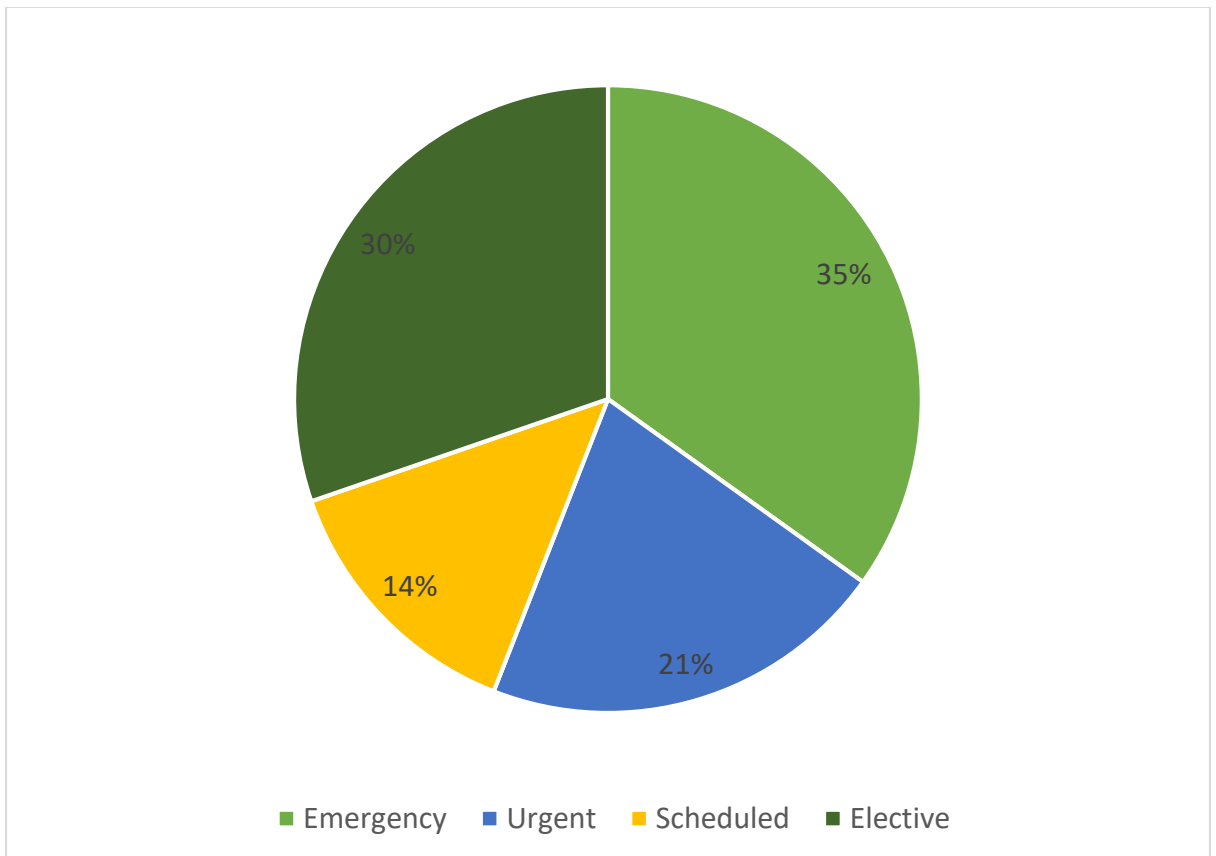


Figure 2: Caesarean deliveries as per DDI classifications.

Common indications in emergency category were Fetal distress (267), Placental Abruption (56), Bleeding placenta previa (33), Footling breech in labour (8), Cord

prolapse (6). Figure 3: Depicts the common emergency CS indications.

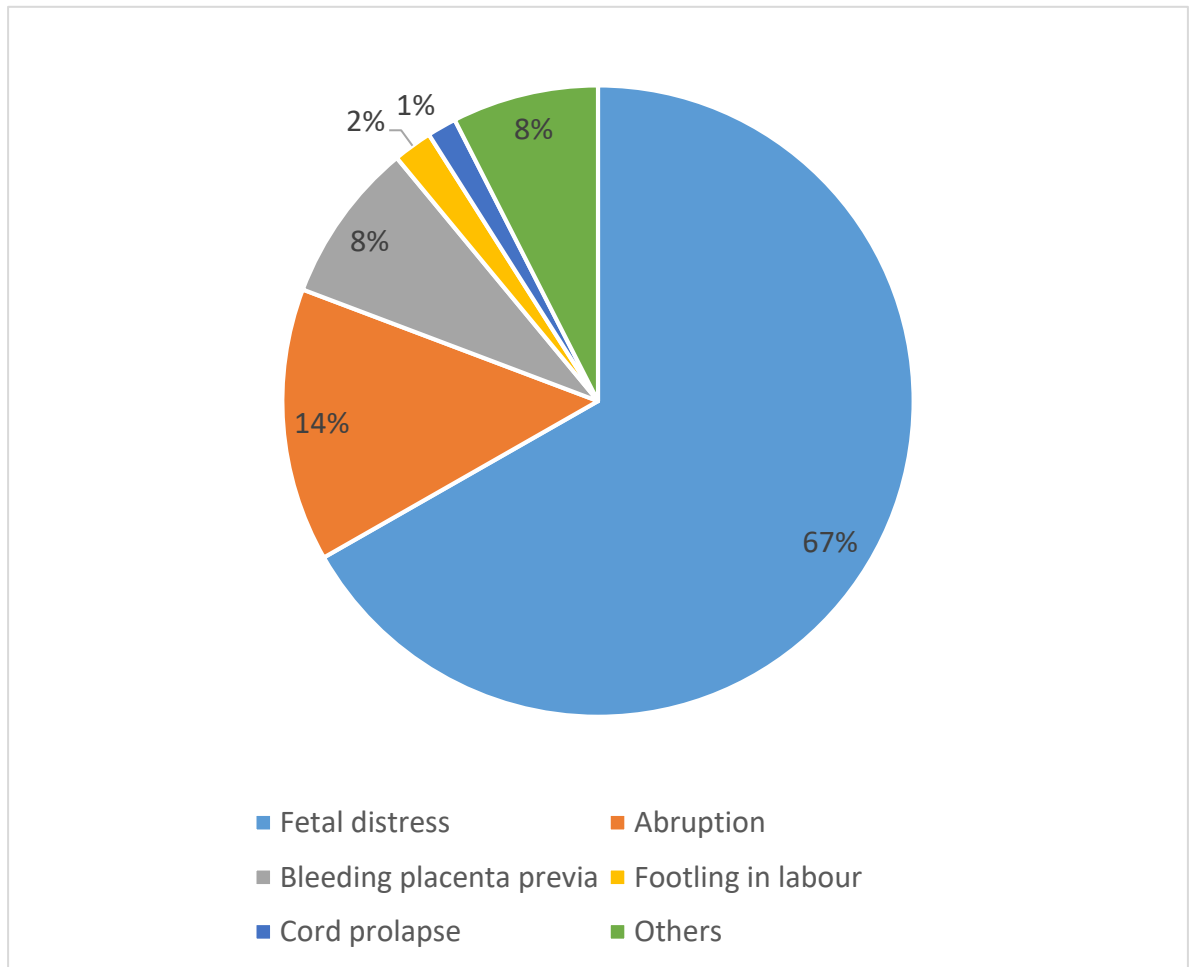


Figure 3-Common indications included in Emergency caesarean deliveries

Common indications in Urgent category were Scar tenderness (70), Meconium stained liquor (62), Fetal tachycardia (24), Non-progress of labour (30), Eclampsia and impending eclampsia (32), Deep Transverse Arrest (15) & Others (8).

Figure 4 depicts the common indications included in urgent category.

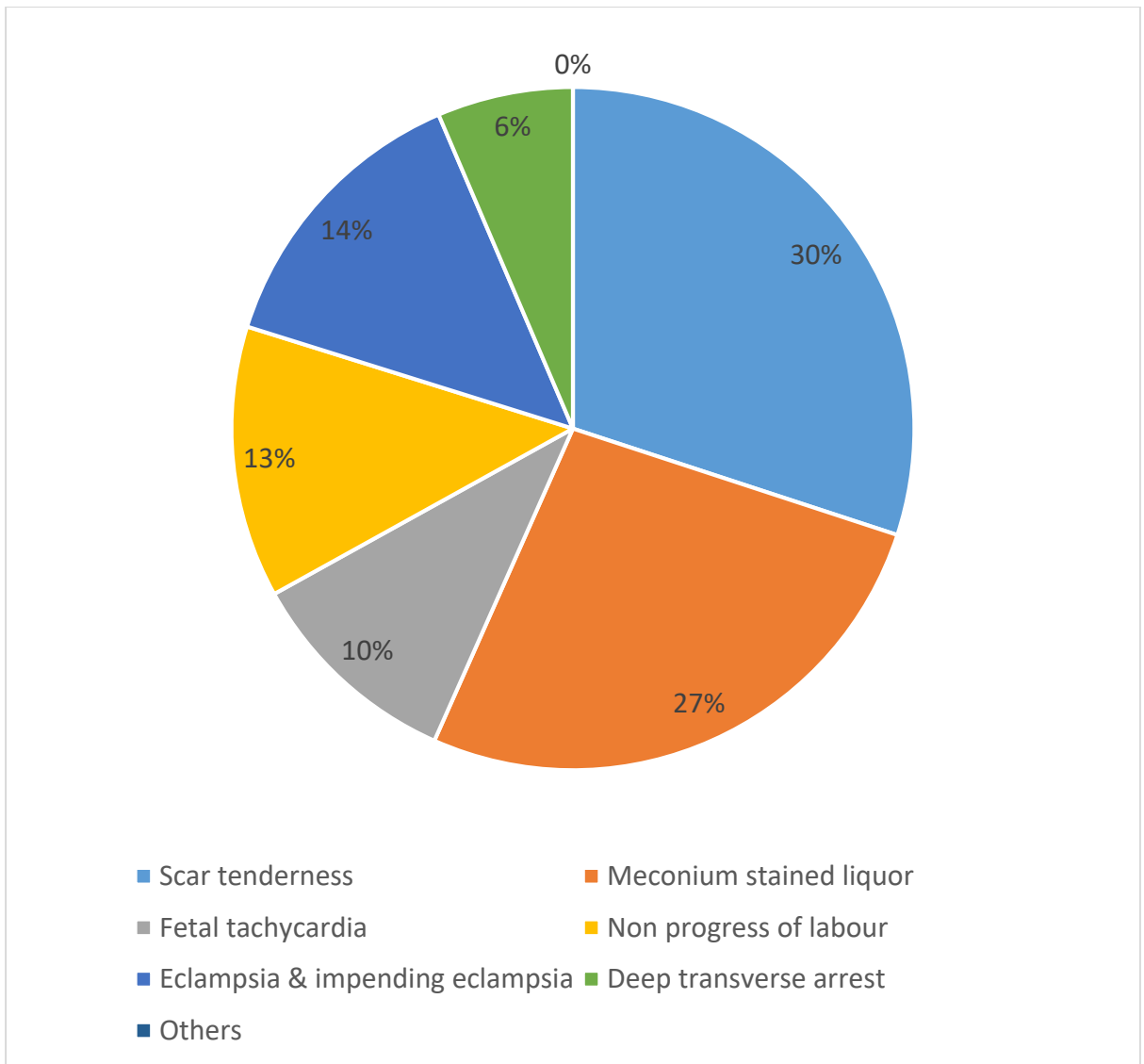
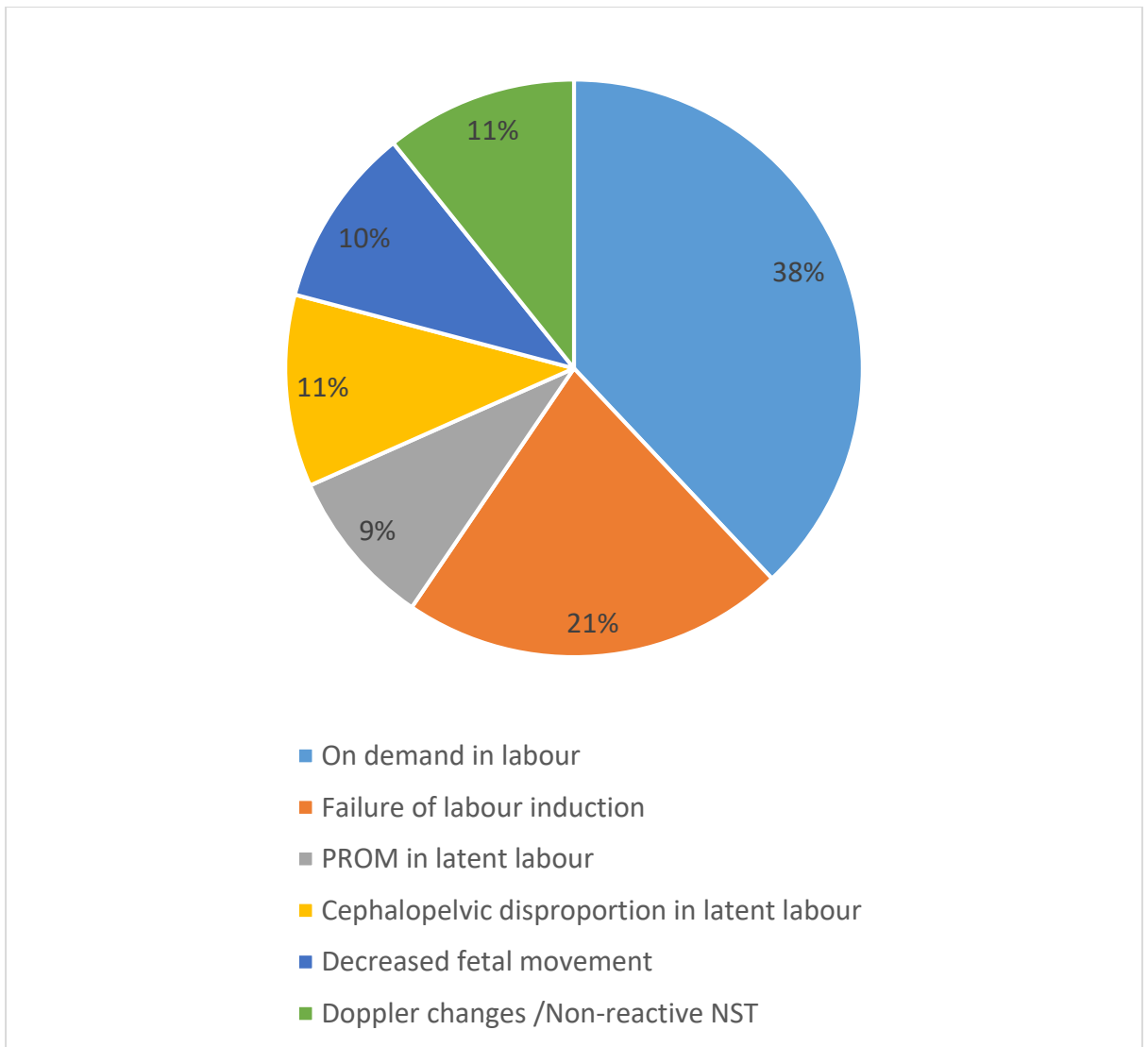


Figure 4-Common indications included in urgent caesarean deliveries

Scheduled CS indication were: On demand in labour (60), Failure of induction of labour (34), PROM in latent labour (14), Cephalopelvic disproportion in labour (17), Decreased fetal movements (16) & Doppler changes/ non-reactive NST (17) are common indications observed in scheduled category. These indications has been demonstrated in figure 5.



**Figure 5-Common indications in scheduled caesarean sections**

Elective CS common indications: On demand (175), FGR (52), Previous LSCS (75), Cephalopelvic disproportion (35) & Placenta accreta spectrum (10) are common indications in elective category. This has been demonstrated in figure 6.

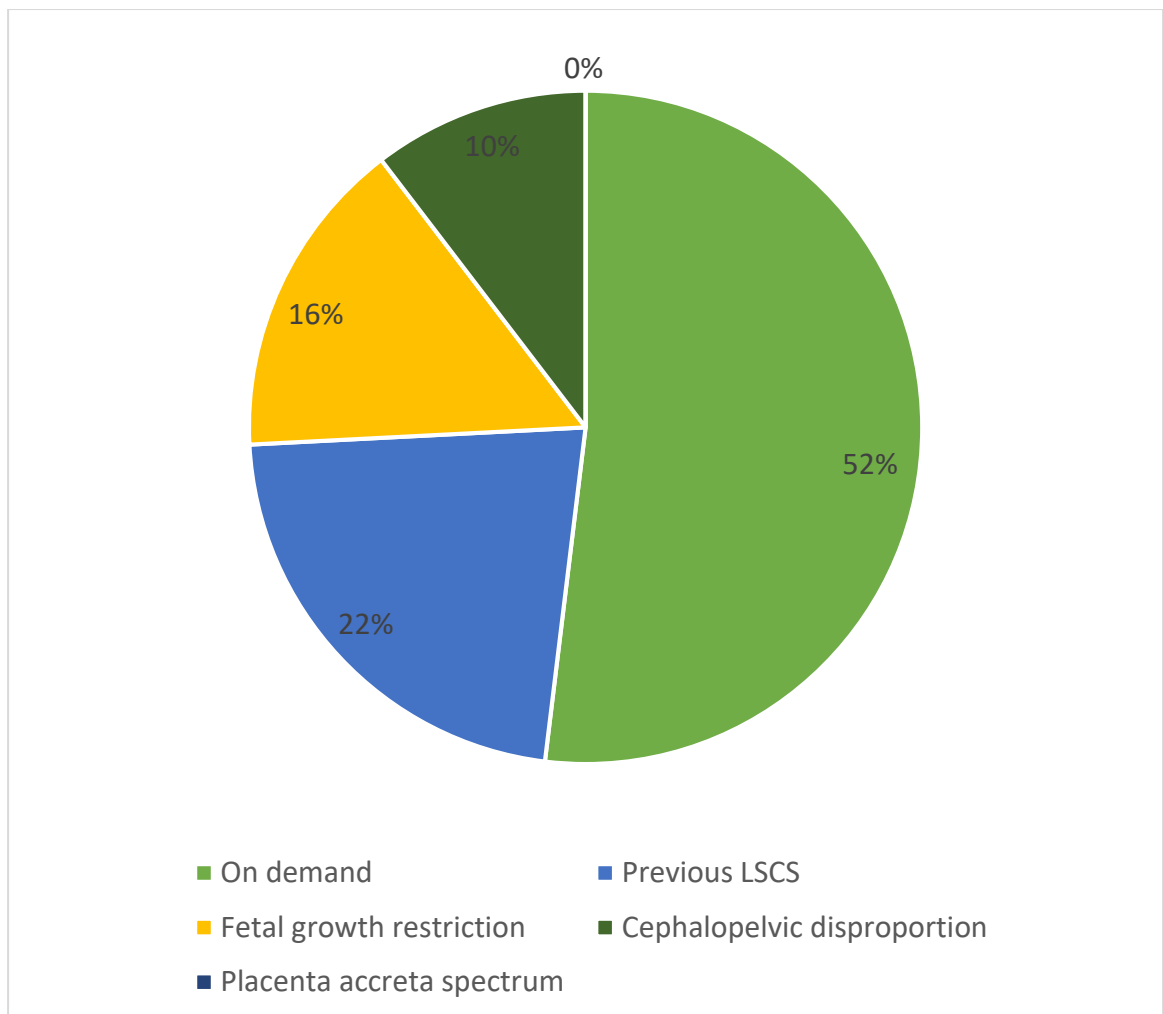


Figure 6-Indications which could be shifted from previous emergency to new elective category

### Discussion

The conventional classification of CS into Elective and Emergency lacks clarity and does not highlight the ‘urgent’ nature of the emergency. Hence non-elective CS are en-bloc classified as emergency. This leads to loss of spectrum of urgency that occurs in obstetrics.

RCOG and NICE guidelines positively endorse the nomenclature of emergency, urgent, scheduled and elective on the basis of DDI. This method of classification was supposed to be simple, reliable and valid giving an objective nature to the classification.

Caesarean section is classified into four groups, namely emergency, urgent, scheduled and elective on the basis of the indications and recommendations of DDI <sup>7,8</sup>.

The 2021 NICE recommendation <sup>7</sup>

- **Category 1:** Immediate threat to the life of the woman or fetus (for example, suspected uterine rupture, major placental abruption, cord prolapse, fetal hypoxia or persistent fetal bradycardia).
- **Category 2:** Maternal or fetal compromise which is not immediately life-threatening.
- **Category 3:** No maternal or fetal compromise but needs early birth.
- **Category 4:** Birth timed to suit woman or healthcare provider.

This recommendation is based mostly on the observation of studies carried out in developed countries, and published data for low-resource settings including India are sparse<sup>8</sup>.

Total caesarean rate in our institute is 59%, of which 19.8 % are elective and 80.9% are emergencies. The higher incidence of caesarean section is attributed to the high risk pregnancies referred to the tertiary care teaching multi-disciplinary institute<sup>9</sup>. After application of NCEPOD classification there were 34.9% emergency, 21% urgent, 13.7 % scheduled and 30.27% elective cases [Figure 2].

Categorization of caesarean deliveries only based on indications as emergencies is unjust. Multiple indications like bleeding placenta previa, fetal distress, and abruption have varying acuity and severity<sup>8,10</sup>. In the present study there were 400 true emergencies and nearly 120 cases could be reclassified as elective procedures. Positively there was no delay in DDI in the true 400 emergencies, contrary to other developing nations like Nigeria<sup>11</sup>. This could be attributed to multidisciplinary team approach, next door operation theatre, 24 hours available anaesthetists, well trained nursing staff, good NICU and ICU back up and blood bank. Delay due to anaesthetist, delayed action of drugs, repeated attempts in giving regional blocks was one of the major cause of delay in emergency sections<sup>12</sup>. As there was no delay in our DDI in emergency cases, perinatal outcomes were not affected significantly, unlike other studies <sup>13</sup>.

In a study by Mishra et al <sup>8</sup> the most common cause of delay was busy operation theatres (39%) and busy labour ward (20%). Manpower shortage accounted for 3.25% of delay in which 1.25% were because of unavailability of anaesthetist [anaesthetists busy in other operation]. Irrespective of experience of the anaesthetist, multiple

attempts of spinal anaesthesia caused delay in 4.5% cases, due to obesity (3.5%) and non-cooperation by the woman (1%).

Blooms et al. found that there was no evidence to indicate that decision delivery interval up to 120 min was detrimental to the neonate unless delivery was crash caesarean section<sup>6</sup>, while others recommended that 30 min of decision delivery interval for category I and 75 min of decision delivery interval for category II caesarean section are justified<sup>14</sup>.

'Crash' caesarean birth is a psychologically traumatic event for women and their partners, and is also stressful for clinical staff<sup>7</sup>.

Scar tenderness, meconium stained liquor, fetal tachycardia, non-progress of labour, eclampsia and impending eclampsia and deep transverse arrest were some of the indications in Urgent category [Figure 4].

On demand in labour, failure of labour induction, PROM in latent labour, cephalopelvic disproportion in latent labour, decreased fetal movement, non-reactive NST were some of the common indications in Scheduled category [Figure 5].

On demand not in labour, cephalopelvic disproportion, previous LSCS, fetal growth restriction and placenta accreta spectrum were few of the indications which could be re-classified from emergency to elective category [Figure 6].

The existing recommendations of DDI for categorization can raise many medico legal issues and impose great undue pressure on health care facility<sup>8</sup>. The study by Mishra et al recommends existing recommendations of decision delivery interval can raise many medico-legal issues and impose great pressure on the health facility to deliver a baby in less than 30 min in all emergency caesarean sections. The study recommends re-categorization of the DDI especially in the emergency and urgent caesarean sections.

The strength of our study is in the sizable number of patients included. The limitation of the study is not addressing the delays for the DDI and the necessary steps to prevent the delay are not dealt with. The study did not answer the neonatal outcomes in the specified categories of the caesarean sections. Nevertheless, the study gives important insights into the need of categorization of caesarean section to help in the triage of the patients in emergency room.

**Conclusion:**

Application of this new classification system will help us to triage the patients and aptly deliver safe care. It will also reduce the medicolegal issues which arise the moment the term ‘emergency’ is used.

Classification of the caesarean as per the four categories with respect to the DDI will help in monitoring and organization of the health facilities with respect to the urgency of the indication of the caesarean section.

### **Ethical Approval:**

A prospective observational study was conducted in the department of High-Risk Pregnancy & Critical Care in Obstetrics a sub-specialty of Obstetrics and Gynaecology at, Bharati Hospital affiliated to Bharati Vidyapeeth [Deemed to be University] Medical College, Pune over a period of 1 year (1st September 2023 to 31st August 2024) after obtaining institutional ethics committee approval(REF: BVDUMC/IEC/60B).

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- 3.

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