

FETOMATERNAL OUTCOME IN OPERATIVE VAGINAL DELIVERIES IN TERTIARY CARE CENTRE

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ABSTRACT:

Background: Operative vaginal delivery (OVD), using forceps or vacuum extraction, is an important obstetric intervention that facilitates vaginal birth while reducing unnecessary caesarean sections. However, it is associated with specific maternal and neonatal complications, making careful case selection and skilled execution essential.

Objectives: To assess the incidence of operative vaginal deliveries and evaluate their fetomaternal outcomes in a tertiary care centre.

Methods: A prospective cross-sectional study was conducted over 18 months (May 2023–November 2024) at Gandhi Hospital, Secunderabad. A total of 150 women with singleton, term, vertex pregnancies undergoing operative vaginal delivery were included. Maternal demographics, obstetric characteristics, indications, intrapartum details, maternal complications, and neonatal outcomes were recorded and analysed using SPSS version 23.

Results: The majority of women were aged 26–30 years (52%) and were primigravidae (68%). Vacuum extraction was performed in 68% of cases, while forceps were used in 32%. The commonest indication was fetal distress (42.67%), followed by prolonged second stage (28.67%). Episiotomy was performed in 82% of women, with second-degree perineal tears being the most frequent (59.33%). Postpartum haemorrhage occurred in 12%, and neonatal intensive care admission was required in 20% of newborns. Cephalhaematoma and neonatal seizures were observed in 4.67% and 2% of neonates, respectively. Most newborns had satisfactory five-minute APGAR scores and birth weights between 2.5 and 3.5 kg.

Conclusion: Operative vaginal delivery is a safe and effective alternative to caesarean section when performed judiciously by skilled obstetricians. Appropriate patient selection and adherence to evidence-based practices can minimise maternal and neonatal morbidity while preserving the benefits of vaginal birth.

KEYWORDS : Operative vaginal delivery, vacuum extraction, forceps delivery, maternal outcomes, neonatal outcomes, fetal distress, prolonged second stage, instrumental vaginal delivery, tertiary care centre.

INTRODUCTION

Operative vaginal deliveries, involving the use of obstetric forceps or vacuum extraction, remain a critical intervention in modern obstetric practice. These procedures are performed when spontaneous vaginal delivery is not feasible, often due to prolonged second-stage labor, fetal distress, or maternal exhaustion. While operative vaginal delivery is associated with reduced caesarean section rates, it carries specific maternal and neonatal risks, necessitating careful selection criteria and skilled execution (1).

The prevalence of operative vaginal deliveries varies significantly across the globe, influenced by obstetric practices, healthcare accessibility, and training availability. In high-income countries such as Canada, the United Kingdom, and Australia, the rate of operative vaginal delivery ranges from 5% to 15% of all births (2,3). In contrast, in low- and middle-income countries (LMICs), operative vaginal delivery rates are much lower, primarily due to a lack of skilled practitioners and inadequate healthcare infrastructure (4).

In India, prevalence of operative vaginal delivery varies ranging from 3% to 10% (5). It is an essential intervention particularly in tertiary care centres where referrals from lower-level facilities increase the complexity of cases. The most common indication for operative vaginal delivery was maternal exhaustion and fetal distress (6). It is found that vacuum extraction was more frequently performed than forceps delivery, primarily due to its ease of application and lower maternal trauma risk (7). However,

neonatal complications such as cephalhematoma and scalp abrasions were more common in vacuum-assisted deliveries, whereas forceps deliveries were associated with higher rates of maternal perineal trauma (8). By promoting the safe and judicious use of operative vaginal delivery, healthcare providers can reduce unnecessary caesarean sections while ensuring better maternal and neonatal outcomes.

The rationale for studying fetomaternal outcomes in operative vaginal deliveries lies in the need to balance maternal and neonatal safety while preventing excessive cesarean deliveries. The novelty of this research is its focus on assessing the real-world implications of operative vaginal delivery in a tertiary care setting, where high-risk pregnancies are often managed. Understanding the outcomes associated with these interventions will provide valuable insights into best practices, training requirements, and protocol modifications needed to optimize maternal and neonatal health. The findings of this study will contribute to evidence-based obstetric decision-making, ensuring that operative vaginal delivery remains a viable, safe, and effective alternative in the management of prolonged second-stage labor and related obstetric complications. Moreover, the study will help identify key areas for intervention, including the need for enhanced training and skill development among obstetricians to improve maternal and neonatal outcomes.

AIMS AND OBJECTIVES

To assess the incidence of operative vaginal deliveries and to assess the fetomaternal outcome of operative vaginal deliveries.

MATERIALS AND METHODS

A prospective cross-sectional study was conducted over 18 months to assess the fetal and maternal outcomes of operative vaginal deliveries at Gandhi Hospital, a tertiary care referral center with a high volume of obstetric cases. The labour room and neonatal intensive care unit (NICU) were the primary locations for data collection. The study included women undergoing operative vaginal deliveries at Gandhi Hospital from May 2023 to November 2024. A total of 150 women were enrolled in the study.

Women with singleton pregnancies, live fetuses at term (37 completed weeks of gestation), and vertex presentation who consented to participate were included. Those with cephalopelvic disproportion, fetal demise, known fetal anomalies or coagulopathies, multiple pregnancies, or abnormal fetal lie and presentation were excluded.

A systematic sampling technique was applied to ensure unbiased selection. The eligible participants were selected from labor room records and medical records were screened to confirm eligibility and verbal consent was obtained from each participant before inclusion in the study.

Women admitted for operative vaginal deliveries were monitored from the antenatal period through the intrapartum and immediate postpartum stages. Details regarding maternal demographic characteristics, obstetric history, labor progression, indication for operative delivery, and fetal parameters were documented. The type of instrument used, duration of the second stage, number of pulls required, and any complications encountered during the procedure were noted. Maternal outcomes, including perineal tears, episiotomy extensions, postpartum hemorrhage, and need for blood transfusion, were recorded. Neonatal assessments included birth weight, APGAR

scores at one and five minutes, need for NICU admission, and presence of birth trauma or respiratory distress.

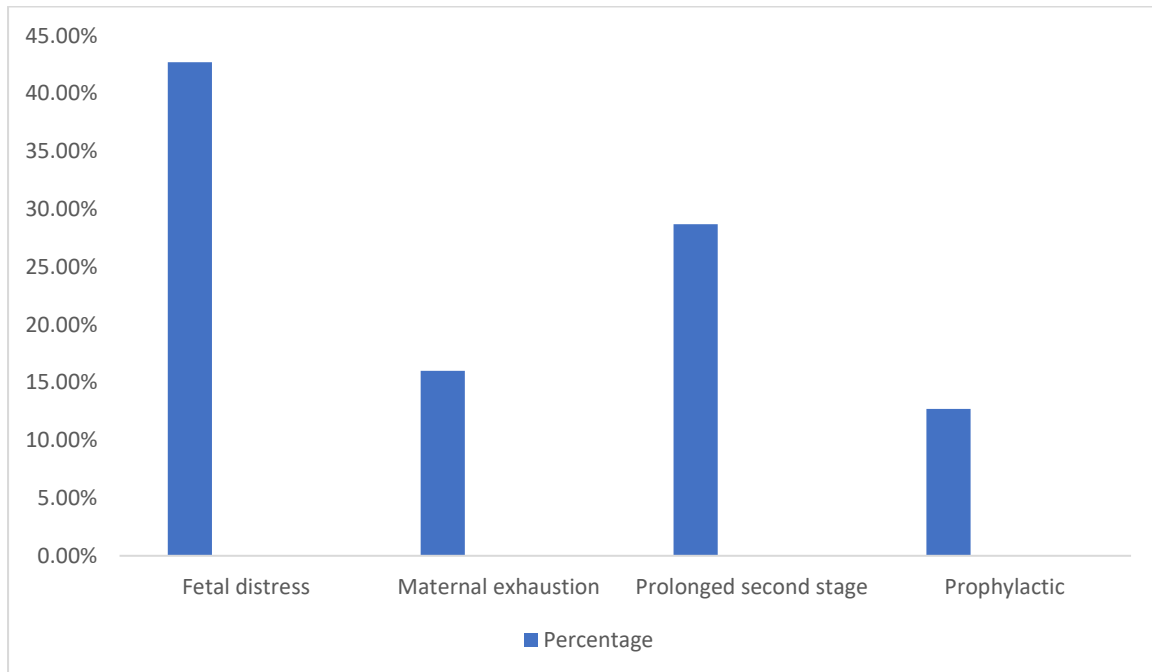
Data were entered into SPSS version 23 for analysis. Descriptive statistics, including mean, standard deviation, and proportions, were used to summarize demographic and clinical characteristics. Sensitivity analysis was conducted to assess the robustness of findings by adjusting for potential confounders such as maternal age and parity.

RESULTS

Total 150 cases were included for the study. The majority were in the 26-30 years category (52%), followed by 18-25 years (35.33%) and those above 30 years constituted 12.67%. Most participants had a gestational age between 38-40 weeks (80%), while 20% had a gestational age of less than 38 weeks. Primigravida cases were higher (68%) compared to multigravida cases (32%). The majority had vacuum-assisted deliveries (68%), while forceps-assisted deliveries accounted for 32% .

The most common reason was fetal distress (42.67%), followed by prolonged second stage (28.67%), maternal exhaustion (16%), and prophylactic indications (12.67%). (FIGURE I)

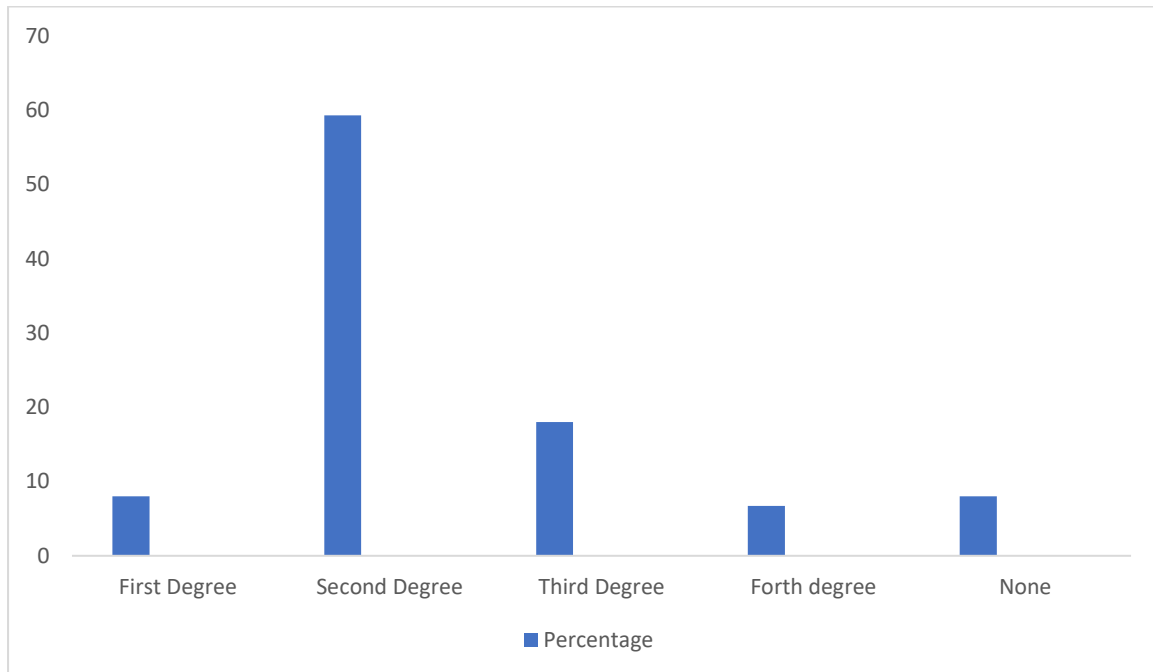
FIGURE I : INDICATIONS FOR OPERATIVE VAGINAL DELIVERY



Episiotomy was performed in 82.0% (n=123) of cases, while 18.0% (n=27) did not receive it. PPH was reported in 12.0% (n=18) of cases, while 88.0% (n=132) did not experience it. Blood transfusion was required in 14.67% (n=22) of cases, whereas 85.33% (n=128) did not require it. Fever was reported in 4.67% (n=7) of cases, while the majority (n=143, 95.33%) did not experience it.

The most common was second-degree tears (n=89, 59.33%), followed by third-degree (n=27, 18.0%), first-degree (n=12, 8.0%), fourth-degree (n=10, 6.67%), and no perineal tears (n=12, 8.0%). (FIGURE II)

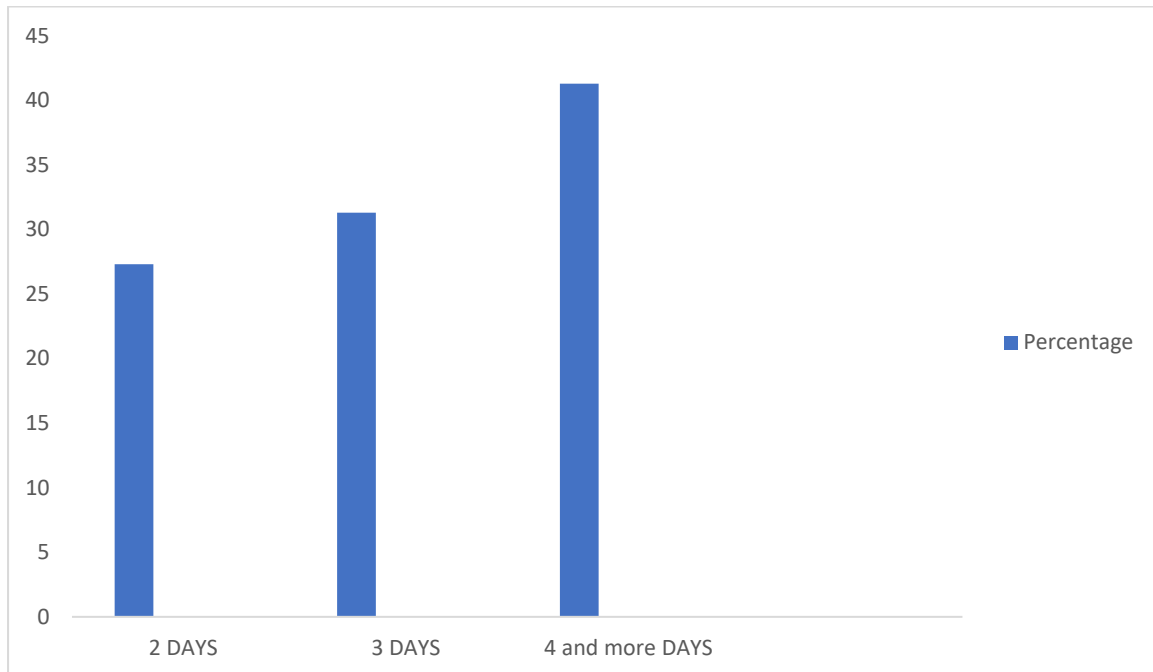
FIGURE II : DISTRIBUTION OF PERINEAL TEARS



Cervical tears were observed in 4.0% (n=6) of cases, while 96.0% (n=144) did not have cervical tears. . Urinary retention was observed in 1.33% (n=2) of cases, whereas 98.67% (n=148) did not experience it.

A hospital stay of four or more days was recorded in 41.33% (n=62), three days in 31.33% (n=47), and two days in 27.33% (n=41). (FIGURE III)

FIGURE III : DURATION OF HOSPITAL STAY

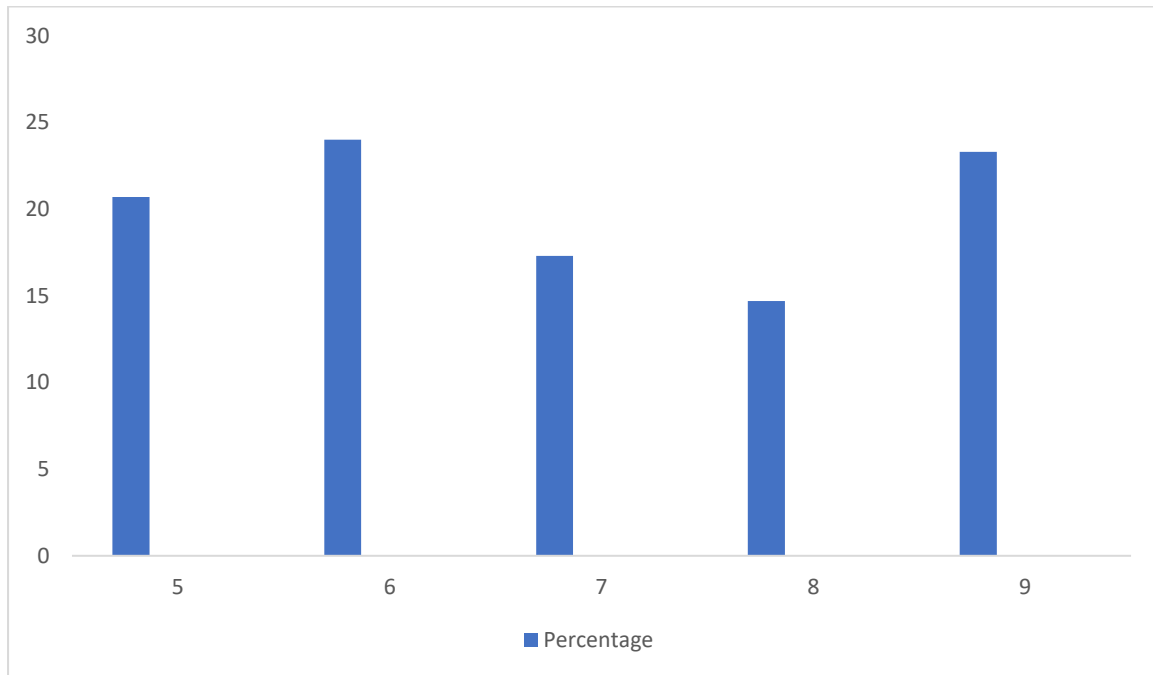


The majority of newborns had a birth weight between 2.5-3.5 kg (n=95, 63.33%), while 36.67% (n=55) had a birth weight greater than 3.5 kg.

Induced labour was observed in 68.67% (n=103) of cases, while spontaneous labour occurred in 31.33% (n=47).

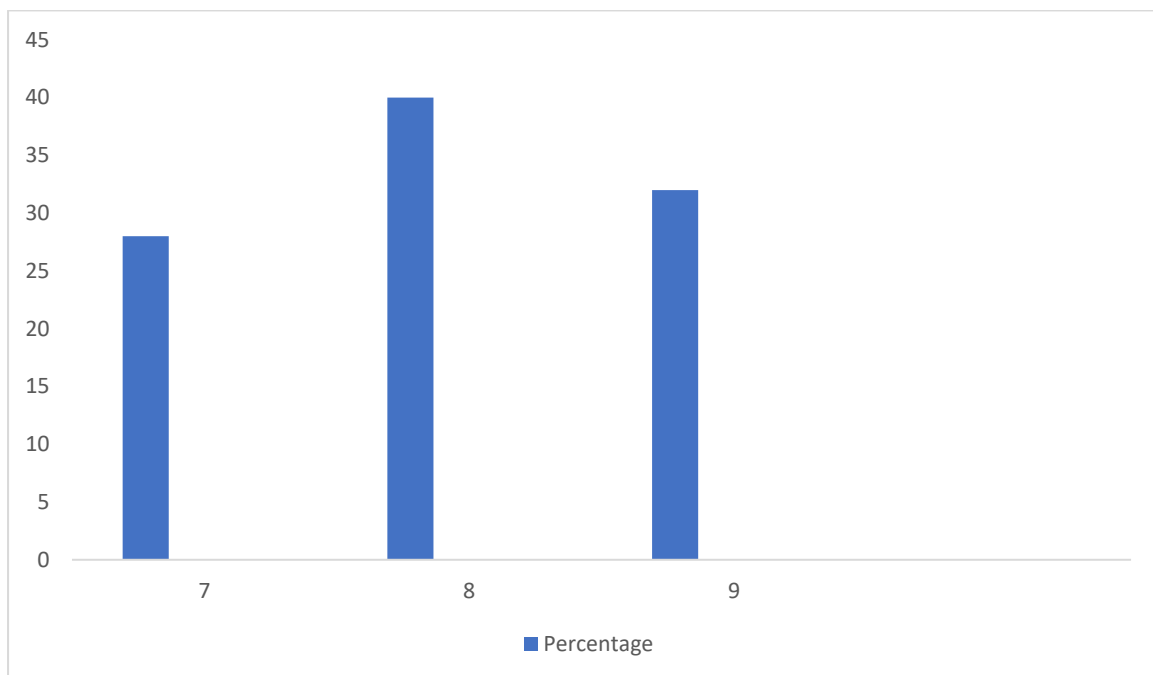
The most common APGAR score at one minute was 6 (n=36, 24.0%), followed by 9 (n=35, 23.33%), 5 (n=31, 20.67%), 7 (n=26, 17.33%), and 8 (n=22, 14.67%). (FIGURE IV)

FIGURE IV : DISTRIBUTION OF APGAR SCORE AT ONE MINUTE



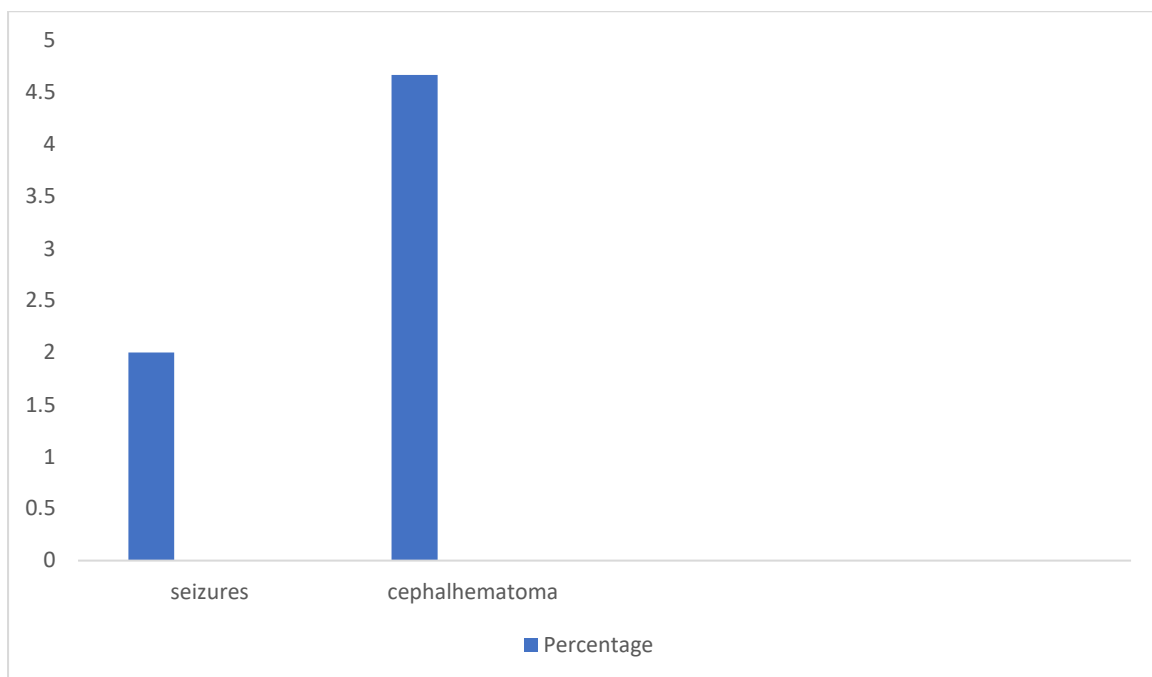
The most common APGAR score at five minutes was 8 (n=60, 40.0%), followed by 9 (n=48, 32.0%) and 7 (n=42, 28.0%). (FIGURE V)

FIGURE V : DISTRIBUTION OF APGAR SCORE AT FIVE MINUTES



Neonatal admission was required in 20.0% (n=30) of cases, whereas 80.0% (n=120) did not require admission. Neonatal seizures were observed in 2.0% (n=3) of cases, while 98.0% (n=147) did not experience seizures. Cephalhematoma was present in 4.67% (n=7) of cases, while 95.33% (n=143) did not have it. (FIGURE VI)

FIGURE VI : COMPLICATIONS IN NEONATES



DISCUSSION

The findings of this study provide crucial insights into maternal and neonatal outcomes following vaginal deliveries, particularly those assisted by vacuum or forceps. The age distribution among participants showed that the majority were between 26-30 years, consistent with other studies indicating that peak reproductive age falls within this range (9). Studies have demonstrated that maternal age influences labor progression and the likelihood of requiring assisted delivery, with older maternal age associated with increased obstetric complications (10). The predominance of primigravida cases in this

study aligns with findings from previous research that suggests first-time mothers are at a higher risk of prolonged labor and assisted vaginal deliveries due to untried pelvic capacity (11).

Gestational age distribution showed that most deliveries occurred between 38-40 weeks, similar to findings from previous studies emphasizing that full-term pregnancies contribute to better neonatal outcomes (12). Preterm deliveries, while less frequent in this study, remain a concern due to their association with neonatal morbidity and the need for specialized care (13).

The mode of delivery was predominantly vacuum-assisted, which is consistent with other studies (14). The preference for vacuum extraction over forceps is often attributed to lower maternal trauma and improved neonatal outcomes (15).

Indications for delivery intervention in this study were primarily fetal distress and prolonged second stage of labor. This is in agreement with existing literature, where fetal distress remains a leading indication for assisted vaginal deliveries (16). Maternal exhaustion also played a significant role in determining the mode of delivery, corroborating studies that highlight the impact of prolonged labor on maternal energy depletion and the need for instrumental assistance (17).

Episiotomy was performed in a significant proportion of cases, which is consistent with findings from similar studies reporting high episiotomy rates in assisted deliveries (18). The results indicate that a significant number of participants experienced perineal tears, with second-degree tears being the most common.

Postpartum hemorrhage (PPH) occurred in 12% of cases, a rate comparable to findings from previous studies examining blood loss in assisted vaginal deliveries (19). The need

for blood transfusion was observed in a small proportion of cases, aligning with studies indicating that severe PPH requiring transfusion is a less frequent but critical complication in vaginal deliveries (5). This underscores the need for adequate obstetric preparedness to manage PPH effectively.

Fever was reported in only 4.67% of cases, similar to findings in other studies indicating that postpartum infections are relatively uncommon with proper aseptic techniques (20). Research supports the use of prophylactic antibiotics in instrumental deliveries to reduce postpartum infections (21).

Neonatal outcomes were generally favorable, with most newborns having a birth weight between 2.5-3.5 kg. Neonatal admissions were required in 20% of cases, largely due to transient respiratory distress and birth trauma.

The incidence of cephalhematoma was 4.67%, emphasizing the association between vacuum extraction and cephalhematoma (22). However, most cases resolve without significant long-term consequences. APGAR scores at one and five minutes were largely within the normal range, suggesting that timely obstetric intervention contributes to better neonatal vitality (23).

Neonatal seizures were rare in this study, which indicate that well-conducted instrumental deliveries do not significantly increase the risk of neonatal neurological complications (9).

Type of labor was predominantly induced, reflecting trends observed in previous studies where induction may be associated with an increased need for assisted deliveries (24).

Hospital stay varied among participants, with a significant proportion requiring prolonged admission beyond four days. This aligns with research showing that complications such as PPH and neonatal morbidity contribute to extended hospital stays (25). While the overall maternal and neonatal outcomes were favorable, the findings underscore the importance of selective and skilled use of instrumental delivery to minimize complications.

CONCLUSION

The findings of the study indicate that operative vaginal delivery remains a crucial intervention in managing obstetric complications such as prolonged second-stage labor and fetal distress. The findings indicate that the majority of deliveries occurred at term, with a significant proportion requiring medical interventions such as induced labor and assisted deliveries. While maternal complications like postpartum hemorrhage and cervical tears were relatively low, episiotomies and perineal tears were common, underscoring the need for improved obstetric techniques to minimize trauma. Neonatal outcomes were generally favorable, with most newborns having an APGAR score above five and a birth weight within the normal range. However, the requirement for neonatal admissions and the occurrence of cephalhematoma and neonatal seizures, though infrequent, emphasize the importance of continuous newborn monitoring.

The results highlight the effectiveness of current maternal and neonatal care practices while identifying areas for potential improvement. Future research should focus on long-term neonatal health outcomes and strategies to enhance maternal recovery, ensuring a holistic approach to perinatal care.

CONFLICT OF INTEREST : None

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