

Original research article

A vacuum extraction study on maternal and fetal outcomes

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Abstract

Aim and Background: Each year, a substantial number of women across the globe necessitate the use of instrumental delivery. The safety and efficiency of vacuum extraction for both the mother and neonate have been well-established, leading to an increase in its utilization. The objective of this study is to examine the maternal and newborn outcomes associated with vacuum extraction. The aim of this study is to investigate the maternal and newborn outcomes associated with the use of vacuum extraction during childbirth.

Methods: A descriptive study was carried out at Department of Obstetrics and Gynecology, Mahadevappa Rampure Medical College, Sedam Road, Kalaburagi, Karnataka, India. Study was done between the January 2022 to November 2022. The data underwent analysis using the SPSS software, and the resulting findings were presented in the form of proportions. The chi-square test was employed to ascertain the disparities between proportions.

Results: The study population primarily comprised of women between the ages of 20 and 25, with primiparae being the most prevalent group, accounting for 55% of the participants. The primary indication for vacuum extraction was fetal distress, with prior caesarean section being the subsequent most prevalent indication. A total of 66% of vacuum extractions were successfully performed within a time frame of 10 minutes. Out of the whole population of mothers, 16% experienced problems, with 4% specifically identified as cases of post-partum haemorrhage. The current study did not document any instances of infant fatality.

Conclusion: The vacuum extraction method of delivery is regarded as an effective approach of aided birth, characterized by a relatively low incidence of failure. Additionally, it provides a delivery strategy that is associated with minimal maternal and fetal problems.

Keywords: Assisted delivery, vacuum extraction, and maternal outcome

Introduction

Each year, a substantial number of women across the globe necessitate the use of instrumental delivery. The selection of the instrument used in the majority of instrumental deliveries is primarily determined by the attending obstetrician's personal preference^[1]. The safety and efficiency of vacuum extraction for both the mother and neonate have been well-documented, leading to its increased utilization. Extensive research has been conducted to evaluate the relative advantages of the vacuum extractor^[2, 3].

The advantages of this technique encompass its simplicity in implementation, promotion of the natural rotation of the improperly positioned fetal head, and its overall safety for both the fetus and, notably, the mother. Consequently, the broader adoption and utilization of vacuum extractors may lead to improved outcomes in the numerous instrumental births conducted annually. The objective of the current study is to examine the maternal and newborn outcomes associated with vacuum extraction^[4-6].

Every year, a significant number of women across the globe necessitate the use of instrumental vaginal delivery. Obstetricians are presented with the option of utilizing either a vacuum extractor or obstetric forceps as devices for facilitating assisted vaginal birth. Myerscough outlines the fundamental distinction in the mechanical processes involved in head extraction using forceps and vacuum extractor. The author elucidates that forceps are utilized to apply a pulling force at the base of the skull, whereas ventouse involves the extraction of the head by means of scalp traction through suction. The selection between these two alternatives has typically been predicated upon established customs and educational background^[7-9].

The current vacuum extractor, which was initially introduced by Malmstrom over fifty years ago, has just lately surpassed forceps as the preferred method for aided vaginal delivery. This shift in preference can

be attributed mostly to the results of several trials undertaken in the past thirty years^[10]. The majority of randomized and nonrandomized trials that have compared the effects of vacuum extractor and forceps delivery on both maternal and fetal outcomes consistently support the notion that vacuum extraction offers greater benefits to mothers compared to forceps. These benefits include reduced incidence of maternal soft tissue trauma, decreased need for regional or general anesthesia, and decreased blood loss. Nevertheless, it is noteworthy to observe that the outcome of these experiments pertaining to the prenatal impacts of vacuum extraction remains uncertain. The ongoing discourse revolves around the comparative advantages of each approach, particularly in relation to the outcome for newborns^[11-13]. The purpose of this study was to conduct a comparative analysis of the maternal and newborn outcomes associated with forceps delivery and forceps extraction.

Materials and Methods

A descriptive study was carried out at Department of Obstetrics and Gynecology Mahadevappa Rampure Medical College, Sediment Road, Kalaburagi, Karnataka, India. Study was done between the January 2022 to November 2022. The data underwent analysis using the SPSS software and the resulting findings were presented in the form of proportions. The chi-square test was employed to ascertain the disparities between proportions.

Inclusion criteria

- The topic of discussion pertains to pregnancies that occur either at term or after term. The concept of parity is of interest.
- The extended second stage of labor, Inadequate maternal care during the second stage of labor, medical conditions related to pregnancy.

Exclusion criteria

- Intrauterine mortality, fetal discomfort, and cephalo pelvic disproportion.

Results

A cumulative count of 50 female individuals were granted admission based on the aforementioned set of inclusion and exclusion criteria. A comprehensive medical history was obtained, followed by a thorough physical examination that including both general and systemic assessments, as well as a specific obstetric examination. The initial blood and urine analyses, admission examination, and abdominal ultrasonography were conducted. The vacuum cups utilized in the current investigation were composed of flexible, silastic material and were available in two different sizes, measuring 40mm and 60mm in diameter. The suction apparatus employed in this study had a suction force range of 0-760mmHg. The parturient under consideration was positioned in a dorsal posture, with the relevant areas cleansed and the bladder voided. A comprehensive examination of the pelvic region was conducted to validate all observations.

The cup was coated with an antiseptic solution and thereafter inserted into the vagina. Prior to insertion, the labia were carefully separated and the cup was positioned against the fetal head at the point of flexion. Subsequently, the suction apparatus was initiated, and the pressure was elevated to a range of 450-600mmHg. A waiting period of 2-5 minutes ensued until the formation of the chignon was observed. Traction was applied at each occurrence of uterine contractions and maternal exertions.

In cases where delivery was not accomplished after 3-4 attempts or within a time frame of 30 minutes, the surgery was terminated and women were scheduled for lower segment cesarean section (LSCS). The study focused on examining difficulties experienced by both the mother and the fetus following childbirth. The examination of neonatal scalp injuries was conducted during resuscitation and at post-natal visits. The study investigates injuries to the maternal delivery canal in conjunction with the assessment of blood loss. Infants exhibiting serum bilirubin levels exceeding 8mg/dl were classified as having clinically severe newborn jaundice. In the current investigation, a total of 50 female subjects successfully underwent vacuum extraction, achieving delivery within three attempts and a time frame of 30 minutes or less.

Table 1: The study population's age distribution

Sr. No.	Age	Number	Percent
1.	<20	02	4.0
2.	20-25 yrs.	40	80.0
3.	25-30 yrs.	05	10.0
4.	30-35 yrs.	02	4.0
5.	>35 yrs.	01	2.0

Table 1 and Figure 1 depict the age distribution of the study population, revealing a peak in the 20 to 25 age group (80%) and a nadir in the over 30 age category.

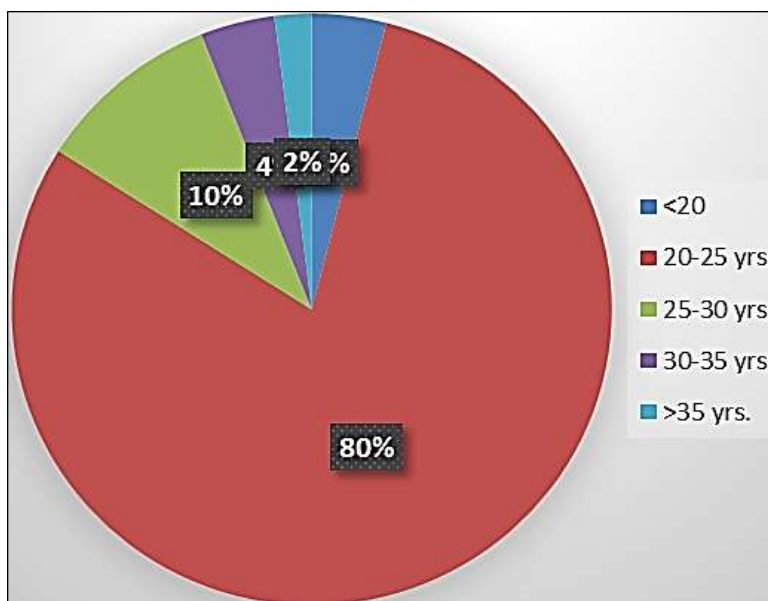


Fig 1: The study population's age distribution

Table 2: Number of attempts

Sr. No.	Attempts	Number	Percent
1.	1.	35	70.0
2.	2.	05	10.0
3.	3.	10	20.0
	Total	50	100.0

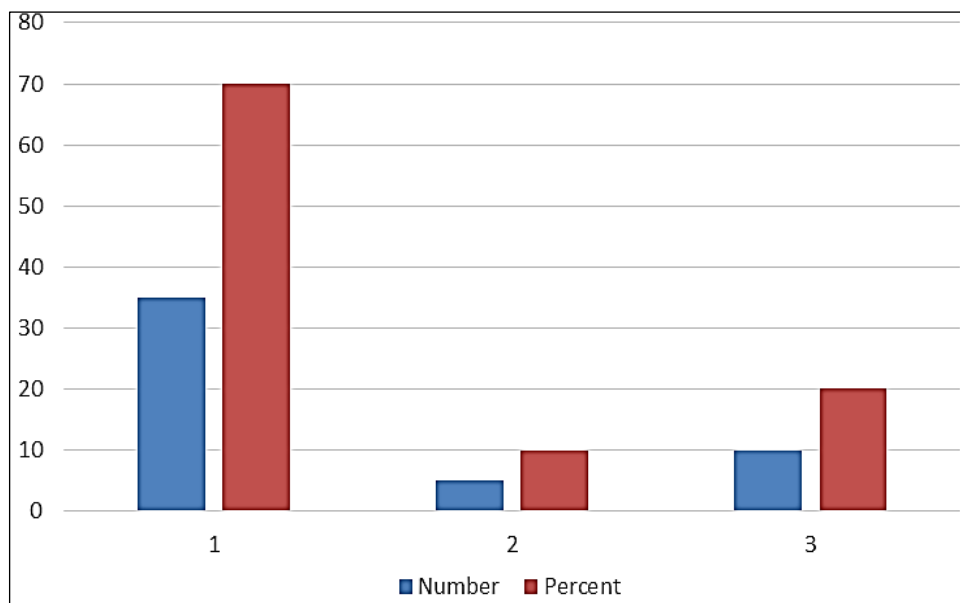


Fig 2: Number of attempts

Table 2 and Figure 2 display the quantitative data pertaining to the number of tries. According to the data, the highest percentage seen was 70%, while the lowest percentage recorded was 10%.

Table 3: With and without maternal complications comparison

Sr. No.	Maternal complication	Number	Mean	Std. Dev.
1.	With	12	10.1 min	2.5 min
2.	Without	38	10.1 min	2.6 min

Table 4: Application delivery interval comparison in minor and major maternal complications

Sr. No.	Maternal complication	Number	Mean	Std. Dev.
1.	Minor	15	12.0 min	2.1 min
2.	Major	35	11.0 min	2.7 min

Table 5: Application delivery intervals and neonatal complication

Sr. No.	Fetal complication	Number	Mean	Std. Dev.
1.	With	09	10.0 min	2.8 min
2.	Without	41	11.0 min	2.5 min

Table 3 and Figure 3 present data on the application delivery intervals and neonatal complications, categorized as 09 numbers for the former and 41 numbers for the latter.

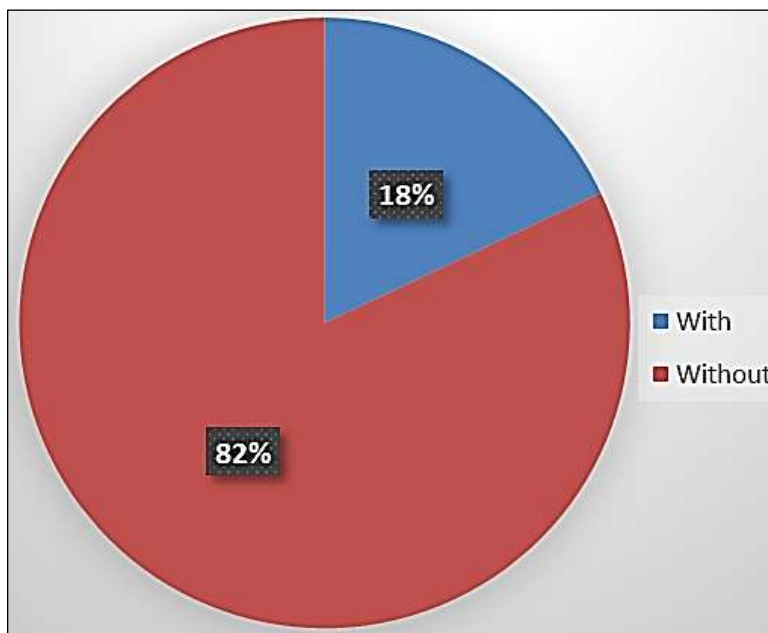


Fig 3: Application delivery intervals and neonatal complication

Discussion

The employment of the Silastic cup vacuum extraction method of delivery has exhibited a growing prevalence in the realm of instrumental deliveries. While it cannot fully substitute all forceps maneuvers, it has been determined that this procedure is an effective approach to aided delivery, exhibiting a minimal occurrence of unsuccessful outcomes. In certain carefully chosen instances, the rotation of the head can be achieved, thereby circumventing the need for a challenging forceps delivery. In the current investigation, a total of 50 instances of vacuum extractions were observed [13, 14].

The study population exhibited an average age of 23 years, with a majority of the female participants falling within the 20-25 year age bracket. A total of 55% of the study population consisted of primiparae, a number that aligns with findings from previous studies conducted by Thomas F *et al.* and Shahla Baloach *et al.* The findings of the current study revealed that approximately 66% of the vacuum extractions were successfully performed within a time frame of 10 minutes [15, 16]. These results closely align with the study conducted by Thompson F *et al.*, which reported a comparable rate of 90% for completing vacuum extractions during the same 10-minute period. According to Bofill J *et al.*, episiotomy was conducted in 66% of instances. In the current investigation, episiotomy was performed in 88% of the cases. The study conducted by J. Low *et al.* reported a mean fetal weight of 3.2kg, whereas the study conducted by N. Prapas *et al.* reported a mean fetal weight of 3.3kg. In our present investigation, we observed a mean fetal weight of 2.8kg. The study conducted by J Low *et al.* demonstrated that 90% of infants achieved an Apgar score greater than 7 at 5 minutes. In our current investigation, we observed a somewhat lower percentage of 83% [17-19].

This phenomenon can be attributed to the fact that the vacuum extractor cup does not take up any extra space between the fetal head and the birth canal, hence avoiding any impact on maternal soft tissue and resulting in minimal discomfort [20]. The study found that women who underwent vacuum extraction during delivery saw significantly lower levels of blood loss in comparison to those who underwent forceps delivery. The reader may contend that familiarity with the assigned instrument could have influenced the evaluation of blood loss. It is acknowledged that despite the inherent challenges and inaccuracies in estimating blood loss during childbirth, such limitations should not have resulted in the

introduction of a bias in the comparison ^[21-23].

In a study conducted by Chowdhary *et al.*, it was found that 16% of maternal complications were observed, with 4% of cases experiencing postpartum hemorrhage. However, the current study reveals a higher prevalence of maternal complications, with 24% of cases affected, and a lower incidence of PPH at 2%. In the present study, it was observed that 8% of the patients exhibited mucosal extension of episiotomy ^[24-27]. This finding is consistent with the study conducted by Shahla Baloach *et al.*, where 17.2% of the cases showed a similar occurrence. Urethral tears were present in 3% and 0.3% of patients, respectively.

Conclusion

The study revealed that within a carefully chosen sample of vacuum extraction cases, there was a notable decrease in the occurrence of maternal trauma and blood loss. Although neonatal injuries were less frequent, neonatal jaundice was a prevalent condition. However, the majority of cases did not necessitate the use of phototherapy. The occurrence of significant fetal trauma could be mitigated through the exercise of appropriate clinical judgment during challenging vacuum extraction procedures. Based on the available evidence, it can be inferred that the utilization of the silastic cup vacuum extraction presents a viable and effective approach for distribution, provided that the clinical conditions are suitable.

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Conflict of interest: None.

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