

## Comparison of Perinatal Outcome for All Modes of Second Stage Delivery in Obstetrics Theatres

Mehwish Munir, Abeera Choudry\*, Sadaf Mumtaz\*, Sobia Hanif, Uroosa Din Muhammad

Department of Obs & Gynae, Armed Forces Post Graduate Medical Institute/ National University of Medical Sciences (NUMS) Rawalpindi Pakistan,

\*Department of Obs & Gynae, Pak Emirates Military Hospital/National University of Medical Sciences (NUMS) Rawalpindi Pakistan

### ABSTRACT

**Objective:** To compare the perinatal outcome for all modes of second stage delivery in obstetrics theatre of Pak Emirates Military Hospital

**Study Design:** Comparative Cross-sectional Study.

**Place and Duration of Study:** Pak Emirates Military Hospital Rawalpindi, Pakistan from Jun 2021 to Jan 2022.

**Methodology:** Neonates born at second stage of delivery in obstetric theatre via any assisted mode were recruited for this study. Neonatal outcome parameters were observed in babies delivered via instrumental delivery (forceps or vacuum) and delivery via caesarian section. These parameters (shoulder dystocia, neonatal intensive care unit admission, neonatal injury and 5-min APGAR<7) were compared in all the groups to look for any statistically significant difference.

**Results:** A total of 150 neonates fulfilling criteria set for the study were included in the final analysis. Mean age of the women included in the study was 33.343±6.431 years. 42(28%) were managed via forceps, 23(15.3%) were managed via vacuum and 85(56.7%) via emergency caesarian section. Statistical analysis revealed that shoulder dystocia and neonatal injury were found statistically significantly less in neonates born to women who were managed via forceps delivery ( $p$ -value<0.05).

**Conclusion:** Caesarian was the commonest mode of delivery used in women who were managed for prolonged second stage of labor. Considerable number of babies born to these mothers had various complications. Use of forceps delivery method emerged as a relatively safer method in our study participants.

**Keywords:** Forceps delivery; Labor; Neonates; Outcome

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### INTRODUCTION

Obstetrics is a specialty which goes hand in hand with various other specialties in order to maintain good outcome for both mother and baby. Advances in neonatology have created a revolution in terms of outcome of neonates especially in high risk and difficult pregnancies and deliveries.<sup>1</sup> Tertiary care units in our country are burned both in terms of obstetric and pediatric services and basic infrastructure lack and patients usually come to big centers with complications.<sup>2</sup> Maternal and child health related conditions during the course of pregnancy, labor or delivery may increase the chances of poor maternal or fetal outcome.<sup>3</sup>

Maternal and fetal homeostasis is linked in number of ways throughout the course of pregnancy but difficult pregnancy or labor may have disastrous impact of outcome for the new-born.<sup>4</sup> Disturbance in maternal homeostasis or any pathological event during labor or delivery may lead to multiple

complications in the baby including pre-term birth, intrauterine growth retardation, infections, metabolic problems, low APGAR score at birth or intrauterine or early neonatal death.<sup>5,6</sup>

This has been an area of interest from clinicians worldwide and some work has been published from obstetricians and pediatricians across the globe. Eze et al. in 2020 in Nigerian population conducted a study and came up with the findings that caesarian section provided no added benefit in terms of neonatal outcome and assisted vaginal delivery is the most viable option in these patients.<sup>7</sup> Shmueli et al. in 2017 published similar study on Israeli patients with prolonged second stage of labor and concluded that delivery via cesarean section carried more morbidity as compared to instrumental delivery.<sup>8</sup> A case control study was published by Benedetto et al. highlighting the relationship of short term outcome in mothers and neonates with mode of delivery. They revealed that from all the methods they studied, instrumental delivery was associated with maximum morbidity in both mothers and neonates.

In a country like ours where health care facilities are still in evolving phase and ante-natal care in also

**Correspondence:** Dr Mehwish Munir, Department of Obs & Gynae, Armed Forces Post Graduate Medical Institute Rawalpindi Pakistan  
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compromised, a lot of women have prolonged or difficult second stage of labor and need arises for assisted delivery via modes other than spontaneous vaginal delivery. A recent local study assessed the impact of mode of delivery on maternal and perinatal outcome in vertex/breech presentation of leading twin.<sup>10</sup> but limited local data is available regarding comparison of neonatal complications in different modes of delivery in patients with prolonged second stage of labor. We therefore planned this study with the rationale to compare the perinatal outcome for all modes of second stage delivery in obstetrics theatre of Pak Emirates Military Hospital.

## METHODOLOGY

This comparative cross-sectional study was conducted at the obstetrics unit and neonatal intensive care unit of Pak Emirates Military Hospital Rawalpindi, Pakistan from June 2021 to January 2022. Sample size was calculated by WHO Sample Size Calculator by using population prevalence proportion of complications in neonates with difficult labor as 3.1%.<sup>11</sup> Non probability Consecutive sampling technique was used to gather the sample.

**Inclusion Criteria:** All pregnant women between the age of 18 and 40 years who had prolonged second stage of labor and needed assisted delivery with modes other than spontaneous vaginal delivery were included in the study along with the babies born to these mothers.

**Exclusion Criteria:** Mothers with uncontrolled systemic illnesses like DM, HTN, IHD or any autoimmune disorders or those with anatomical abnormalities of uterus or vagina were excluded. Mothers with neonates born with severe congenital malformations or those who could not survive at time of birth or those who had intrauterine death were excluded as well. Those who refused to undergo any specific mode of delivery were not included in the study.

IREB committee approval was taken via letter no. A/28/EC/367/2021. Written informed consent was taken from the mothers before study and then neonates were recruited for study. Intervention in second stage of labor was made if it was prolonged or maternal or fetal distressed was observed by consultant gynecologist.<sup>12</sup> Mode of intervention was also decided by consultant gynecologist in liaison with team with maximum input of patient if possible. Modes were classified as instrumental delivery (forceps or vacuum) and delivery via caesarian

section.<sup>13</sup> Outcome parameters (shoulder dystocia, neonatal intensive care unit admission, neonatal injury and 5-min APGAR<7) were observed by consultant pediatrician or neonatologist with in first 48 hours of birth of baby.<sup>14</sup>

Characteristics of mothers and neonates participating in the study and the outcome variables were described with the help of descriptive statistics. Pearson chi-square analysis and Fischer exact test were done to evaluate the association of various neonatal outcomes with different modes of delivery in our study participants. Statistics Package for Social Sciences version 24.0 (SPSS-24.0) was used for all the above-mentioned analysis. The *p*-values  $\leq 0.05$  were considered significant for establishing the association between variables.

## RESULTS

A total of 150 neonates born to mothers with prolonged second stage of labor and managed in obstetric theatre were included in the final analysis. Mean age of the women included in the study was 33.343±6.431 years. 42(28%) were managed via forceps, 23(15.3%) were managed via vacuum and 85(56.7%) via emergency caesarian section. Table-I summarizes the general characteristics of study participants. 89(59.3%) babies were male while 61(40.7%) babies were female. 38(25.3%) neonates were admitted in neonatal intensive care unit, 16(10.6%) had shoulder dystocia while 1(0.7%) neonate died within 24 hours of birth. Out of total participants, 15(10%) had neonatal injury during the birth, 14(9.3%) had APGAR score<7 at 5 minutes of birth while 03(2%) had other complications.

**Table-I: Characteristics of Mothers and Neonates Included in The Study**

Study parameters	n (%)
Age of mothers (years)	
Mean + SD	33.343±6.431 years
Range (min-max)	19-39 years
<b>Gender of Neonates</b>	
Male	89(59.3%)
Female	61(40.7%)
<b>Methods Used For Delivery</b>	
Caesarian delivery	85(56.7%)
Instrumental delivery	42(28%)
Forceps delivery	23(15.3%)
Vacuum delivery	
<b>Poor Neonatal Outcomes</b>	
Admission at nursing intensive care unit	38(25.3%)
Shoulder dystocia	16(10.6%)
Neonatal injury	15(10%)
APGAR>7 at 5 minutes	14(9.3%)
Others	03(2%)
Neonatal death	01(0.7%)

Table-II revealed the association of various neonatal outcomes with mode of delivery used in the study participants. Statistical analysis revealed that shoulder dystocia ( $p$ -value-0.014) and neonatal injury ( $p$ -value-0.013) were found statistically significantly less in neonates born to women who were managed via forceps delivery while neonatal intensive care unit admission ( $p$ -value-0.108) and low APGAR score at 5 minute ( $p$ -value-0.121) did not differ significantly in any group studied in the analysis.

**Table-II: Neonatal Outcome In Babies Born Via Different Modes During Second Stage of Labor**

Outcome parameters	Forceps delivery	Vacuum delivery	Cesarean delivery	$p$ -value
<b>Neonatal Intensive Care Unit Admission</b>				
No	36(85.7%)	15(65.2%)	61(71.7%)	0.108
Yes	06(14.3%)	08(34.8%)	24(28.3%)	
<b>Shoulder dystocia</b>				
No	41(97.6%)	17(73.9%)	76(89.4%)	0.014
Yes	01(2.4%)	06(26.1%)	09(10.6%)	
<b>Neonatal injury</b>				
No	41(97.6%)	17(73.9%)	77(90.5%)	0.013
Yes	01(2.4%)	06(26.1%)	08(9.5%)	
<b>APGAR&gt;7 at 5 minutes</b>				
No	41(97.6%)	20(86.9%)	75(88.2%)	0.121
Yes	01(2.4%)	03(13.1%)	10(11.8%)	

## DISCUSSION

Babies who are born after difficult labor or via modes other than spontaneous vaginal delivery may have multiple systemic problems and complications. With advancements in obstetric care and introduction of various modes of delivery including instrumental and delivery and caesarian section, a lot of pregnancies could be saved which used to end either in maternal or fetal mortality in the past. Still all the modes used to assist the process of labor have certain demerits especially if not used by trained professionals. This study was conducted to compare the perinatal outcome for all modes of second stage delivery in obstetrics theatre of Pak Emirates Military Hospital.

Salman et al. in 2017 performed a study regarding impact of mode of delivery on early neonatal outcome. They came up with the findings that cephalohematoma, low 5 min Apgar score, and asphyxia were more common in the patients who underwent vacuum delivery due to non-reassuring fetal heart rate while neonatal sepsis was more common in cases of prolonged second stage of labor.<sup>15</sup> We only studied neonates born to women with prolonged second stage of labor and compared all modes of delivery in these patients. Forceps delivery

appeared to be safer as compared to vacuum delivery in our data set.

Nolen *et al.* conducted an interesting study and published the perspective and recommendation of women who underwent forceps or vacuum delivery. They revealed that vacuum method was recommended by most of the women on basis of long term symptoms experience.<sup>16</sup> Our study was slightly different from that of Nolen *et al.* as we studied short term outcome parameters in neonates and concluded that forceps delivery method is slightly better than vacuum method or emergency caesarian section.

Tan et al. in 2019 in their study concluded that more than 1/4th of the patients with prolonged second stage underwent caesarians section and there was no clinically significant difference in mother and baby outcome in women undergoing instrumental delivery or caesarian section.<sup>17</sup> Our results were slightly different as we did not found any significant difference in NICU admission or APGAR score in 5 minutes in all the groups but neonatal injury and shoulder dystocia were significantly less in patients undergoing forceps delivery.

Eleven-year retrospective data was published in 2018 from Germany. It was an interesting data set around very important aspect of mode of delivery and it was revealed that vaginal tears and cephalohematomas were found more in vacuum assisted delivery as compared to forceps delivery.<sup>18</sup>our results supported their findings as neonatal injuries were seen more in modes other than forceps delivery in our data set as well.

## LIMITATION OF STUDY

This was data from one department and could not be generalized. Deciding the time for intervention in second stage of labor and then mode of delivery are dependent on the physician involved and multiple physicians were involved so there could be bias in the results. Moreover, only short term complications in neonates were noted. Long term follow-up of mothers and babies may generate better results in this regard.

## CONCLUSION

Caesarian was the commonest mode of delivery used in women who were managed for prolonged second stage of labor. Considerable number of babies born to these mothers had various complications. Use of forceps delivery method emerged as a relatively safer method in our study participants.

**Conflict of Interest:** None.

**Funding Source:**

### Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

MM: & AC: Study design, drafting the manuscript, data interpretation, critical review, approval of the final version to be published.

SM: & SH: Data acquisition, data analysis, approval of the final version to be published.

UDM: Critical review, concept, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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