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Comparison of Maternal and Neonatal Outcomes of Spontaneous versus Directed Pushing Techniques in the Second Stage of Labour

Mehreen Abbas, Aleena Hanif, Fatima Habib, Sundus Rashid, Hania Batool, Ammara Suleman

Abstract

Objective: To compare the maternal and neonatal outcomes of spontaneous and directed methods of pushing during the second stage of the labour.

Study Design and Setting: This Prospective comparative study was conducted at the Department of Obstetrics and Gynecology, PAF Hospital Islamabad, over three months.

Methodology: After approval from the Ethical Review Committee (ERC Ref No: ERC/FPGMI/OBG/11/2026). A total of 60 singleton term pregnancies were included and equally divided into two groups (n = 30 each). Group A performed spontaneous pushing, whereas Group B performed directed pushing using the Valsalva. Maternal outcomes were length of second stage of labour, episiotomy, perineal trauma and maternal fatigue. Neonatal outcomes consisted of one minute Apgar score and NICU admission. Independent sample t-test was used for continuous variables. Chi-square test or Fisher's exact test was used for categorical variables where appropriate, P-value =0.05 was considered statistically significant.

Results: The duration of second stage was significantly shorter in spontaneous group (38 ± 10 min) vs directed group (45 ± 12 min) (p = 0.002). Episiotomy (26.7% vs 43.3%, p = 0.041), perineal trauma (13.3% vs 26.7%, p = 0.048), and maternal fatigue (16.7% vs 36.7%, p = 0.031) were significantly lower in spontaneous group. No significant difference was observed in Apgar score 7: 6.7% vs 13.3%, p = 0.337; NICU admission: 3.3% vs 10.0%, p = 0.296.

Conclusion: Associated with better maternal outcomes and without jeopardizing the safety of the neonate, Spontaneous pushing was associated with shorter second stage of labour, lower episiotomy rate, reduced perineal trauma, and decreased maternal fatigue, without significant differences in neonatal outcomes.

Keywords: Directed pushing, Maternal outcomes, Neonatal outcomes, Perineal trauma, Spontaneous pushing

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INTRODUCTION

Childbirth is a complicated physiological procedure which entails synchronized uterine contractions, cervical dilatation and gradual fetal passage through the birth canal. Traditionally, labour is divided into three stages with the second phase of labour being the phase between full cervical dilatation and neonatal birth. This stage should be managed effectively since it greatly determines the maternal and neonatal outcomes. There is a vast array of clinical practices in the second stage of labour, especially the method of pushing on the part of the mother used, which can impact on the duration of labour, maternal exhaustion, and perineal injuries, as well as the neonatal health.[1]

The pushing of the mother during the second stage of labour is the most important physiological aspect that enables the fetus to descend and deliver. Historically, obstetric care providers have promoted women to push deeply referred to as the Valsalva manuever whereby the woman is advised to breathe deeply, retain the breath and push strongly about 10 seconds during each contraction. Although this method has been used traditionally in numerous hospital environments due to an assumption that it would reduce

the second stage of labour and enhance the efficiency of delivery,[2] the growing body of research indicates that the method might not necessarily be physiologically ideal and might have some detrimental implications on both maternity and the newborn baby. Spontaneous pushing, also known as physiologic or open-glottis pushing, on the contrary, enables women to push as per their natural impulse and not because of the rigid commands given to them by medical professionals. Under this technique, women push spontaneously using open-glottis breathing and do not hold their breath long. The method is believed to be more compatible with the natural expulsive reflex of the body and it has the potential to decrease maternal fatigue, enhance oxygenation and minimize pelvic floor injury, making the discussion about the superiority of pushing method an ongoing significant issue in obstetric practice and research.[3] Some studies are done to examine the influence of directed or spontaneous pushing in the second stage of labour. Other researchers have indicated that directed pushing could reduce the time of the second stage of labour than spontaneous pushing.[4] A systematic review of randomized controlled trials concluded that in some instances Valsalva pushing may shorten the second stage by a margin of about 18 minutes although the value of such a decrease is not clear-cut especially when it comes to the potential adverse maternal effects such as pelvic floor dysfunction and urinary complications.

Outcomes of pushing on women have been studied widely. Directed pushing can raise intrathoracic pressure and diminish venous return, and this can cause maternal hypoxia and fatigue. In other studies, prolonged breath holding can also lead to decreased uteroplacental blood flow, which can in turn affect fetal oxygenationand, conversely, studies indicate that women who employ spontaneous pushing methods may have lower rates of episiotomy and perineal trauma than those who employ directed pushing.[5,6] Another factor of the effectiveness of pushing techniques in labour is also the neonatal outcomes. Some of the most important neonatal indicators comprise the use of Apgar scores, resuscitation requirement, and admission to the neonatal intensive care units (NICU).[7] Clinical evidence suggests that spontaneous pushing can usually result in neonatal outcomes comparable or even superior to those of directed pushing.[8] Some observational studies have found that directed pushing can elevate the risk of neonatal resuscitation or nursery admission, yet Apgar scores might not differ significantly between the two practices.[9] More systematic reviews and meta-analyses have been done more recently examining the comparative efficacy of these pushing methods. A meta-analysis of ten studies on over 1500 women indicated that spontaneous pushing was related to a reduced rate of cesarean section and extended episiotomy at no cost to the baby with no adverse impact on neonatal outcomes.[10] These findings suggest that letting the baby push naturally would yield similar or even better results with no negative effects on the neonatal outcomes.

The other factor which is of importance to be considered is how the pushing techniques would affect the health of the pelvic floor in the long term. Over the intra-abdominal pressure when performing directed pushing can also lead to the pelvic floor dysfunction that subsequently leads to urinary incontinence or prolapse of pelvic organs in later life. The evidence of pelvic floor assessment has shown that women who employ Valsalva manoeuvre can have more postpartum dysfunction of the pelvic floor than those who employ spontaneous pushing techniques.[11] The above findings imply that the use of a vaginal labour management technique should be cautiously considered to determine whether it would result in more maternal morbidity in the long run.

The past few years have shown a rise in the interest of using physiologic childbirth practices in which excessive intervention and interference with the natural events of labour are minimized. Even with the recommendations, directed pushing is still common in most clinical practices because of the teaching tradition and fear of long labour even with the recommendation of modern midwifery guidelines.

Maternal and neonatal morbidity in developing nations like Pakistan is a major public health problem. Evidence-based obstetric practices are necessary in enhancing the outcomes and lowering the complications during the childbirth process. Despite some international research that has compared the methods of spontaneous and directed pushing techniques, there are short local data about the outcomes of these techniques on the maternal and neonatal outcomes among Pakistani populations. The variations in healthcare systems, patients and clinical practices render it significant to consider these methods in the context of the locality.[13] Thus, the current research intends to evaluate maternal and newborn outcomes of spontaneous versus directed pushing methods of the second stage of the labour in a tertiary care hospital. This study aims at offering evidence which can guide obstetric practice and enhance the outcome of childbirth by considering the factors of second stage of labour duration, perineal trauma, maternal fatigue, Apgar scores, and neonatal complications.

METHODOLOGY

This quasi-experimental comparative study was conducted in the Department of Obstetrics and Gynecology at PAF Hospital, Islamabad, from 4th March, 2026 to 5th June, 2026. This study has been formally approved by the Fazaia Post Graduate Medical Institute (FPGMI) Ethical Review Committee (ERC) with the official reference number ERC/FPGMI/OBG/11/2026 dated 03 March 2026. All eligible participants were fully briefed on the study purpose, risks and benefits prior to participation; absolute data confidentiality was assured through structuring protocols

and written informed consent was carefully obtained from each participant. Randomization was not performed. The number of samples was carefully designed with the standard formula for comparing two independent proportions:

$$n = \frac{(Z_{\alpha/2} + Z_{\beta})^2 \times [P_1(1 - P_1) + P_2(1 - P_2)]}{(P_1 - P_2)^2}$$

With a 95% confidence level, á = 0.05, 80% statistical power, â = 0.20, and the confidence that the episiotomy rate would be different between the two clinical pushing techniques in the various regions of the country, the sample size was estimated to be 60 total participants. The sample size of the pregnant women was 60 and the allocation was 30 women in each arm (n = 30), using a non-probability consecutive sampling technique. The participants in Group A were managed using spontaneous pushing methods, while participants in Group B were managed using the traditional Valsalva maneuver as directed pushing.

Strict inclusion criteria were used resulting in a study population of pregnant women with singleton, term pregnancies (37-41 weeks' gestation), documented cephalic fetal presentation and spontaneous onset of active labour[12]. On the other hand, the exclusion criteria were applied systematically to exclude patients who were cesarean delivered, had experienced more than one gestation, had been instrument delivered, and had clinical evidence of acute fetal distress[13]. In addition, women with high-risk maternal co-morbidities (preeclampsia and gestational diabetes mellitus) were excluded to avoid baseline systemic influences that might affect outcomes.

Each participant in Group A received special attention from the labor staff and was repeatedly asked to push, using their instinctive urge to do so, during uterine contractions, without any special set of rigid instructions to hold their breath or time the pushing. Participants allocated to Group B received active clinical instructions only during contraction to take a deep breath, close the glottis to hold their breath, and push downwards with maximum force for about 8-10 seconds per contraction cycle. All participants in both arms received the standard, baseline obstetric nursing care as well as labor management procedures as required in the institution.

Primary maternal outcomes were recorded and assessed using a subjective Likert scale (mild, moderate, severe) in terms of the duration of the second stage of labour (in minutes), the rate of Maternal fatigue was assessed after delivery using a structured proforma based on the mother's subjective report, Episiotomy was performed restrictively and only when clinically indicated, Perineal trauma was defined as any first-, second-, third-, or fourth-degree perineal tear recorded after delivery, Standard institutional analgesia protocols were followed in both groups. Neonatal outcomes were measured by the 1-minute Apgar score and/or admission to a neonatal intensive care unit (NICU). A structured proforma was used to record all the clinical parameters dynamically. Data was analyzed using the software of IBM SPSS Version 27. Means ± SD were used for continuous data and absolute frequencies and percentages for categorical data, Independent sample t-test was used for continuous variables. Chi-square (X^2) test was used for categorical variables. Fisher's exact test was applied where expected cell counts were less than 5. A p-value = 0.05 was considered significant.[14]

RESULTS

A total of 60 women were included in the study and equally divided into two groups: spontaneous pushing (n=30) and directed pushing (n=30). Everyone finished the research and was included in the analysis. There was no statistically significant difference of baseline characteristics, such as maternal age, gestational age, and parity, showing that their populations were homogeneous. In terms of maternal outcomes, the second stage of labour among women in the spontaneous pushing group (38 ± 10 minutes) took a significantly shorter time than that of directed pushing group (45 ± 12 minutes) with a significant difference among them (p=0.002). Episiotomy was lower in the spontaneous group 8 (26.7%) than in the directed group 13 (43.3%). Likewise, Perineal trauma was lower in the spontaneous group 4 (13.3%) compared with the directed group 8 (26.7%). Maternal fatigue was lower in the spontaneous group 5 (16.7%) than in the directed group 11 (36.7%). Such results suggest that there is a positive relationship between spontaneous pushing and maternal outcomes. Poor neonatal outcomes in the form of Apgar score <7 was observed in 2 (6.7%) neonates in the spontaneous group and 4 (13.3%) in the directed group, however that did not show significant values between the two conditions (p=0.337). Likewise, NICU admission occurred in 1 (3.3%) neonate in the spontaneous group and 3 (10.0%) in the directed group. Generally, the outcomes of the infants in the two groups were similar. No statistically significant difference was observed in baseline characteristics between the two groups ($p > 0.05$), indicating that both groups were comparable at baseline. Table 2 shows the comparison of maternal outcomes between the two groups, Women in the spontaneous pushing group experienced significantly better maternal outcomes, including shorter duration of labour, lower rates of episiotomy, reduced perineal trauma, and less maternal fatigue. Figure 1 illustrates the graphical comparison of maternal outcomes. Table 3 presents neonatal outcomes between the two groups. Figure 2 shows the graphical representation of neonatal outcomes. The Neonatal outcomes were generally comparable between the two groups, with no statistically significant differences observed ($p > 0.05$). Spontaneous pushing demonstrated a trend toward better neonatal adaptation without compromising neonatal safety.

Table 1: Baseline Characteristics of Study Participants (n=60)

Variable	Spontaneous Pushing (n=30)	Directed Pushing (n=30)	Total (n=60)	p-value
Maternal Age (years)	27.4 ± 4.2	28.1 ± 4.6	27.8 ± 4.4	0.412
Gestational Age (weeks)	38.6 ± 1.1	38.8 ± 1.0	38.7 ± 1.0	0.298
Primiparity	16 (53.3%)	17 (56.7%)	33 (55.0%)	0.721
Multiparity	14 (46.7%)	13 (43.3%)	27 (45.0%)	0.721
Booking Status (Booked)	24 (80.0%)	23 (76.7%)	47 (78.3%)	0.754
Booking Status (Unbooked)	6 (20.0%)	7 (23.3%)	13 (21.7%)	0.754
BMI (kg/m²)	26.1 ± 2.8	26.8 ± 3.1	26.4 ± 2.9	0.368
Mean Cervical Dilatation at Active Labour (cm)	5.1 ± 0.7	5.0 ± 0.8	5.0 ± 0.7	0.611

Table 2: Maternal Outcomes Comparison

Outcome	Spontaneous Pushing (n=30)	Directed Pushing (n=30)	Relative Difference	p-value
Duration of Second Stage (minutes)	38 ± 10	45 ± 12	Shorter by 7 minutes	0.002
Episiotomy	8 (26.7%)	13 (43.3%)	Reduced by 16.6%	0.041
Perineal Trauma	4 (13.3%)	8 (26.7%)	Reduced by 13.4%	0.048
Maternal Fatigue	5 (16.7%)	11 (36.7%)	Reduced by 20.0%	0.031
Prolonged Second Stage (>60 min)	2 (6.7%)	6 (13.3%)	Reduced by 13.3%	0.337
Need for Instrumental Assistance	1 (3.3%)	3 (10.0%)	Reduced by 6.7%	0.296
Postpartum Hemorrhage	1 (3.3%)	2 (6.7%)	Reduced by 3.4%	0.552

Figure 1: Maternal Outcomes Comparison

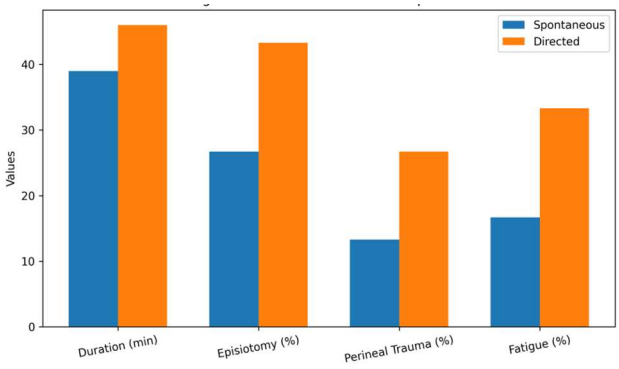

Figure 2: Neonatal Outcomes Comparison

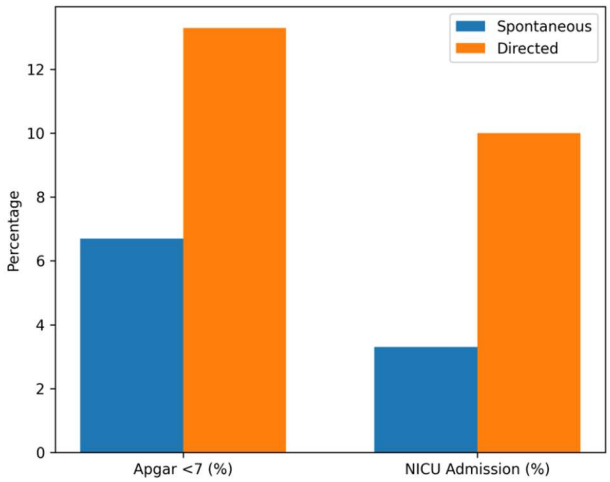

Table 3: Neonatal Outcomes Comparison

Outcome	Spontaneous Pushing (n=30)	Directed Pushing (n=30)	Relative Difference	p-value
Apgar Score <7 at 1 Minute	2 (6.7%)	4 (13.3%)	Reduced by 6.6%	0.337
NICU Admission	1 (3.3%)	3 (10.0%)	Reduced by 6.7%	0.296
Need for Neonatal Resuscitation	1 (3.3%)	3 (10.0%)	Reduced by 6.7%	0.296
Respiratory Distress	1 (3.3%)	2 (6.7%)	Reduced by 3.4%	0.552
Birth Asphyxia	0 (0.0%)	1 (3.3%)	Reduced by 3.3%	0.313
Mean Birth Weight (kg)	3.1 ± 0.4	3.0 ± 0.5	Slightly higher	0.447
Neonatal Cyanosis	0 (0.0%)	1 (3.3%)	Reduced by 3.3%	0.313

DISCUSSION

This research compared the performance of spontaneous, and directed pushing methods in the second labour stage. The results show that better maternal outcomes are linked with spontaneous pushing at a similar neonatal safety level. The duration of the second stage of labour was significantly shorter in the spontaneous pushing group. It calls the past philosophical understanding into question that directed pushing speeds up delivery.[15] Rather, the physiologic pushing can be used to increase the efficiency of uterine contractions and maternal effort coordination.[16] There was a high difference in the rates of episiotomy in the spontaneous group. Directed pushing raises the intra-abdominal pressure and causes a higher stress on perineal tissues and a higher risk of surgery. Lower rates of episiotomy prove to be clinical because it minimizes the amount of pain and complications during the postpartum stage.[17] Likewise, less common was perineal trauma with spontaneous pushing.[18] This implies that natural, but controlled pushing will decrease excessive stress on pelvic structures. Reduced occurrence of trauma results in improved post-partum recuperation and decreased long-term effects, including pelvic floor dysfunction. In spontaneous pushing maternal fatigue was much less.[19] Directed pushing has long breath-holding and hard work, which causes fatigue. On the contrary, spontaneous pushing enables women to save on energy since they go by the natural flow. [20]

There was no significant difference in neonatal outcomes such as Apgar scores and NICU admission. This shows that spontaneous pushing cannot be detrimental to fetal safety. A little improved trends of the spontaneous group further invest the safety profile of the group. These results reflect the increasing trend to physiologic practices in childbirth. The need to foster spontaneous pushing concurs with the current trends in obstetric care and is based on the comfort of the mother and less intervention[21]. The findings demonstrate that spontaneous pushing improves maternal outcomes without compromising neonatal safety. Limitation: There are some limitations in this study that must be noted. The study used a quasi-experimental comparative design, which may limit causal interpretation. The study was performed in a single tertiary care center, and the results are not necessarily generalizable to other health care settings or populations in other regions of Pakistan. Second, the number of participants was limited to 60 following the strict inclusion criteria and restricted three-month data collection window, which may limit the statistical power needed to identify subtle differences in low-incidence neonatal complications. Lastly, this study only measured immediate MNH outcomes up to the time of hospital discharge, and long-term postpartum outcomes like chronic pelvic floor dysfunction, pelvic organ prolapse, or urinary or fecal incontinence were not objectively tracked and assessed.

CONCLUSION

Spontaneous pushing was associated with shorter second stage of labour, lower episiotomy rate, reduced perineal trauma, and decreased maternal fatigue, without significant differences in neonatal outcomes. In general, spontaneous pushing is a safer and more physiologic and patient-centered method of labour management.

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Authors Contribution:
Mehreen Abbas: Main Conception Of Study, Manuscript Writing, Data Collection, Results, And Conclusion, Final Approval.
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