

ORIGINAL ARTICLE

The Impact of Valsalva's versus Spontaneous Pushing Techniques during Second Stage of Labor on Postpartum Maternal Fatigue and Neonatal Outcome

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ABSTRACT

Objectives: The objective of the following study is to find out the effects of two different pushing techniques in the second stage of labor on postpartum maternal fatigue and APGAR score of neonates in Saudi females, as very few such studies are available in these patients. Hence this study was carried out in this population to see the results and to do a comparison with other studies in literature as well as to find out how we can make labor awareness in our females.

Design: Quasi experimental study.

Settings: It was carried out in two hospitals in the eastern province of Saudi Arabia from 1 January, 2011 up to 31 December, 2011. One hundred Saudi women who fulfilled criterion were included in the study. They were randomized and the results seen.

Results: There was a significant difference in postpartum fatigue within 60 min and 24 h in two groups as $P = 0.001$, $P < 0.001$ respectively. There was a significant difference of APGAR score of newborn in both groups, i.e., $P < 0.001$.

Conclusion: It is concluded that physiological pushing technique has a better outcome with regard to postpartum maternal fatigue and neonatal APGAR score when compared to directed pushing during the second stage of labor.

Key words: 2nd stage of labor, APGAR score, maternal fatigue, spontaneous pushing, Valsalva's maneuver

ملخص البحث:

هدفت هذه الدراسة لمعرفة تأثير أسلوبين للدفع في المرحلة الثانية للمخاض على إرهاق الأم بعد الولادة في عينة من النساء السعوديات وعلى مقياس أبكار (APGAR). للأطفال حديثي الولادة وهدفت الدراسة أيضًا للتعرف على كيفية رفع وعي السعوديات فيما يتعلق بالمخاض. أجريت هذه الدراسة التقريرية التجريبية بمستشفيين بالمنطقة الشرقية للمملكة العربية السعودية في العام ١٠٢٠م حيث اختيرت مائة امرأة ممن استوفوا الشروط بصورة عشوائية.

أظهرت النتائج فرقًا إحصائيًا معنويًا بين إرهاق ما بعد الولادة خلال ستين دقيقة وأربعة وعشرين ساعة في المجموعتين. كما أظهرت فرقًا إحصائيًا معنويًا في مقياس أبكار (APGAR) لحديثي الولادة في المجموعتين. وخلصت الدراسة إلى أن أسلوب الدفع الطبيعي في الولادة أدى إلى نتائج أفضل فيما يتعلق بإرهاق الأم ومقياس أبكار مقارنة مع الدفع الموجه خلال المرحلة الثانية للولادة.

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INTRODUCTION

Labor is a normal physiological process whereby the fetus is expelled out from maternal womb to the outside world. Labor itself has multidimensional impact on women including physiological, psychological, social and spiritual aspects. The physiology of labor and birth process normally work in harmony to make the miracle of

birth in an orderly and predictable sequence to make the labor natural, safe and a satisfying experience.^[1]

Nature carefully orchestrates a unique plan for labor and birth. The primary force is the uterine contractions, which lead to cervical dilation and effacement. The secondary force is the abdominal wall musculature, adding to the primary force and hence the labor is interplay between primary and secondary forces.

Labor is categorized into three stages. The second stage is really a challenging issue for the woman and the obstetrician as well. It is associated with the delivery of the baby after full dilatation of the cervix. There are controversial opinions regarding the pushing techniques in the second stage of labor^[1] but their exact relationship with the outcome of labor is still disputed. Women are typically directed to pull back their knees, tuck in their chin, take a deep breath, bear down at the start of contraction and push with a closed glottis (Valsalva's maneuver) for ten seconds with the goal of pushing the baby out. However, there is no evidence that coaching the women in their expulsive efforts has any benefit over allowing women to bear down and push according to her own reflex, in response to the pain of contractions and pressure felt from the descent of the fetal head.^[2]

Directed pushing (Valsalva's maneuver) is still practiced in many parts of the world. There is no strong evidence to support this technique in the literature and randomized controlled trials have questioned this practice and emphasis is more on spontaneous pushing.^[3-5]

In recent years, greater emphasis is on physiological management of labor rather than interfering with nature. A meta-analysis of pooled data from 12 randomized trials of immediate (directed) pushing versus spontaneous pushing found that physiological pushing results in increased chances for vaginal birth and lesser perineal trauma.^[6]

Aim

The aim of this study was to explore the fetomaternal outcome in two different techniques during the second stage of labor and maternal fatigue in the postpartum period in Saudi females.

MATERIALS AND METHODS

It was a Quasi experimental study conducted in delivery rooms and postpartum units of tertiary care hospitals of the eastern province of Saudi Arabia. Both are tertiary care centers with high admission rate of parturients. It

was carried out from 1 January, 2011 up to 31 December, 2011.

A total of 100 primigravidas admitted to the delivery room in labor who fulfilled the following criteria's were included in the study:

1. Primigravidas at 37-42 weeks of gestation.
2. Spontaneous onset of labor.
3. Single/cephalic alive fetus.
4. Age 20-34 years old.
5. Willing to participate in the study.

The complicated labor and patients with co-existing medical or obstetrical risk factors were excluded to avoid confounding factors.

Hundred primigravidas fulfilling the criteria were randomly assigned as control or experimental group. Demographics and personal profile such as age, education, residency and occupation were noted. Obstetrical data such as booked, unbooked, duration of pregnancy and complication during pregnancy were noted as well.

The course of the second stage of labor according to the assignment was observed. Visual analogue fatigue scale (VAFS), developed by Hukison^[7] [Figure 1] was used extensively to measure pain, nausea, dyspnea and level of fatigue within 60 minutes and 24 hours after delivery. VAFS has ten horizontal lines with written description at each end.

The subjects were asked to mark on the line; the point that they feel will represent their perception of the current state. The possible score range from 0 to 100 was measured in mm on a horizontal line. The tool was translated in Arabic and tested by the researchers.

Statistical analysis

Data was coded, entered in MS Excel 2003 and Statistical Package for social science (SPSS) version 15 was used to calculate the results. The variables were presented mathematically by median and interquartile range. The differences and associations were statistically tested by non-parametric test, namely Mann-Whitney

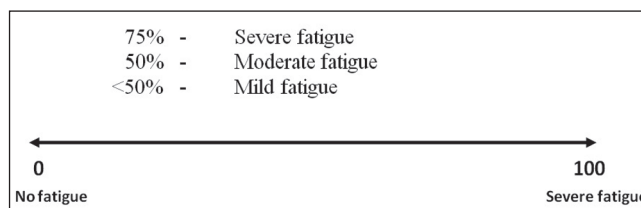


Figure 1: The "traditional visual analogue scale used to measure pain and fatigue"

test, Friedman and Wilcoxon test. Comparison between groups was done by square and Mann-Whitney test.

Regarding the APGAR score ≥ 7 as good and < 7 as depressed relative risk, incidence of depression in control and experimental groups was calculated.

RESULTS

The study showed that the experimental group (spontaneous pushing) during the second stage of labor had less median value of fatigue as compared to control (directed pushing), i.e., 3 compared to 4.5 during the first stage and 5 compared with 7.5 during early second stage of labor, 4.5 compared to 9 within 60 min after delivery and 3 compared with 9 during first 24 h postpartum. These differences were statistically significant during early second stage of labor, within 60 min and 24 h postpartum, as $P = 0.001$ and $P < 0.001$ respectively [Table 1 and Figure 2].

Regarding the APGAR score in control and experimental group, it ranged between 2 and 10 in experimental (spontaneous pushing) and 1-10 in control (directed pushing) groups. The median APGAR score was significantly higher in experimental when compared with the control group as $P \leq 0.001$ [Table 2]. Also, the study showed that the majority of the experimental group about 92% and about 72% of the control group had an incidence of fetal heart rate deceleration. Eight

percent of neonate under experimental group and 28% under control group required admission in neonatal intensive care unit and needed special consultation ($P \leq 0.001$, $P < 0.05$ and $P < 0.05$ respectively) [Tables 2, 3 and Figure 3].

DISCUSSION

Labor is a stressful time both for the couple and family. A woman cannot forget her experience of birth for the rest

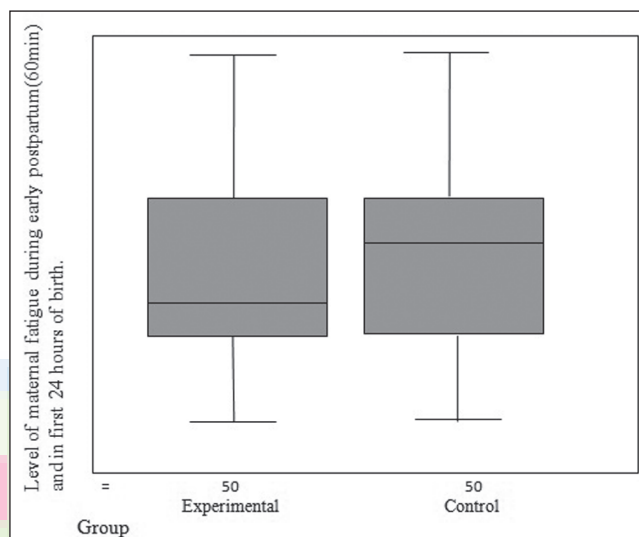


Figure 2: Box plot for the median distribution of level of maternal fatigue scores during early postpartum (60min) and first 24 hours of birth among experimental and control groups

Table 1: Distribution of experimental and control groups according to level of fatigue during labor and early postpartum period					
Levels of fatigue	During early 1 st stage	During early 2 nd stage	Within 60 min after child birth	During 1 st 24 h postpartum	Test
Experimental (spontaneous)					
Minimum-maximum	1-10	1-9	1-10	1-9	$F=26.128^*$; $P<0.001$ $Zb_{1,2}=4.053^*$; $P<0.001$
Mean \pm SD	3.66 \pm 2.28	4.76 \pm 2.61	4.88 \pm 2.53	4.20 \pm 2.68	$Zb_{1,3}=4.189^*$; $P<0.001$
Median (IQR)	3 (3)	5 (3.25)	4.50 (4)	3 (4.25)	$Zb_{1,4}=2.008^*$; $P=0.045$ $Zb_{2,3}=0.663$; $P=0.5$ $Zb_{2,4}=2.007^*$; $P=0.045$ $Zb_{3,4}=3.345^*$; $P=0.001$
Control (directed)					
Minimum-maximum	1-10	1-9	1-10	1-10	$F=46.862^*$; $P<0.001$ $Zb_{1,2}=2.225^*$; $P=0.03$
Mean \pm SD	4.64 \pm 2.90	6.54 \pm 2.48	7.66 \pm 2.24	7.66 \pm 2.31	$Zb_{1,3}=5.922^*$; $P<0.001$
Median (IQR)	4.50 (5)	7.50 (3.25)	9 (3.25)	9 (4)	$Zb_{1,4}=5.900^*$; $P<0.001$ $Zb_{2,3}=2.011^*$; $P=0.04$ $Zb_{2,4}=1.890$; $P=0.06$ $Zb_{3,4}=0.046$; $P=0.96$
	$Za=1.559$; $P=0.1$	$Za=3.361^*$; $P=0.001$	$Za=5.115^*$; $P<0.001$	$Za=5.699^*$; $P<0.001$	

*Level of fatigue during labor and postpartum period. Za – Mann Whitney test; F – Friedman test; Zb – Wilcoxon Signed Rank tests; SD – Standard deviation, IQR – Interquartile range

of her life. In the recent years, more emphasis is being placed on evidence based medicine.

Second stage of labor has been in review by obstetricians since a long time. In recent years, there has been an increasing interest in the physiological approach towards labor with less emphasis placed on time limitations.

In this study, it was seen that spontaneous pushing during the second stage of labor was associated with less complications with regards to mother and baby when compared with directed pushing.

A similar study was done by Roberts *et al.* in the year 2002, who stated that prolonged active pushing in the second stage of labor can have deleterious effects on baby and mother resulting in maternal acidosis. Acidosis can be picked up by lactic acid, partial pressure of carbon dioxide and pH at the time of birth. Furthermore, spontaneous pushing results in better descent and rotation of the fetal head, lesser perineal trauma and lesser maternal fatigue in the immediate postpartum period.

A similar study carried out at two hospitals in Northern Taiwan by Kelly M (2010) revealed a significant longer duration of the second stage of labor in spontaneous as compared to the experimental group. Moreover, there were no significant adverse neonatal or maternal outcome between the groups but there was a significant difference in postpartum fatigue in both groups in 1st h after delivery ($t = -3.8, P < 0.01$) and within 24 h ($t = -4.2, P < 0.01$) postpartum.^[8]

Literature review showed that excessive exertion in the second stage of labor places greater physical demands on the mother. Hence, fatigue increases and there is an increase in the cesarean section rate. Overexertion can also overstretch vaginal and pelvic structures, contributing to future bladder control problems, unnecessary perineal tearing and increase in episiotomies rate.^[9]

The findings of our study were relatively in the match with the results of Roberts JE (2002),^[10] and Williams E *et al.* (2000).^[11] They found out that delayed pushing

Table 2: Distribution of experimental and control groups according to values of their newborn APGAR scores at 1st min and 5 min

Newborn APGAR score	At 1 st min		At 5 th min	
	Minimum-maximum Mean±SD Median (IQR)	Test	Minimum-maximum Mean±SD Median (IQR)	Test
Experimental (spontaneous)	2-10 8.38±1.85 9 (0)	Z=3.732* P<0.001	2-10 8.70±1.47 9 (0)	Z=3.813* P<0.001
Control (directed)	1-10 6.50±2.71 6 (4)		1-10 6.56±2.76 6 (4)	

*Statistical significant, $P < 0.05$. Z – Mann Whitney test, SD – Standard deviation, IQR – Interquartile range

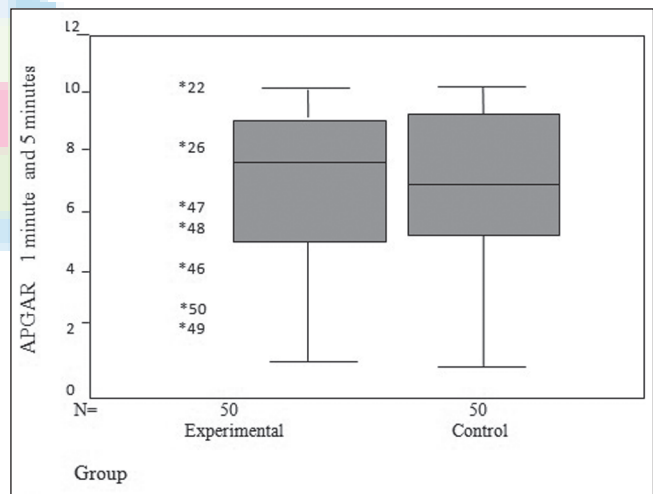


Figure 3: Box plot for the median distribution of APGAR scores at 1st min and 5 min after delivery among experimental and control groups

Table 3: Distribution of experimental and control groups according to the physiological fetal well-being as measured by newborn APGAR scores (risk measurements) immediately after delivery

Newborn APGAR score	At 1 st min		Test	At 5 th min		Test
	Good N (%)	Depressed N (%)		Good N (%)	Depressed N (%)	
Experimental (spontaneous)	43 (86.0)	7 (14.0)	$\chi^2=16.327^*$ P<0.001 RR=3.371 AR=38 NNT=2.63	47 (94.0)	3 (6.0)	$\chi^2=29.219^*$ P<0.001 RR=9.33 AR=50 NNT=2
Control (directed)	24 (48.0)	26 (52.0)		22 (44.0)	28 (56.0)	
Total	67 (67.0)	33 (33.0)		69 (69.0)	31 (31.0)	

*Statistical significant, $P < 0.05$. χ^2 – Chi square; RR – Relative risk; NNT – Number needed to treat; AR – Attributable risk

did not increase the risk of cesarean birth or operative vaginal deliveries and it is safe to allow a period of passive descent until the women feel the real urge to push, also the newborn status at birth as measured by APGAR scores, were not affected negatively by the longer overall length of the second stage.

Regarding the APGAR score of neonates, in our study the spontaneous pushing group showed a higher and good APGAR score when compared with control pushing. This findings partly agreed with Tuuli MG *et al.* who suggested a reduction in fetal brain oxygenation associated with maternal pushing efforts. Another randomized controlled trial was undertaken in 2005 by Simpson KR (2006)^[12] to determine any differences between the use of directed and spontaneous pushing techniques in the second stage of labor. Seventy three multiparas women were randomly allocated to either the control group (directed pushing $N = 38$) or the experimental group (spontaneous pushing $N = 38$). Women in the experimental group had longer second stage of labor, the difference between the APGAR score were similar at 1 and 5 min after birth.

Regarding APGAR score our study is in line with a study conducted by Roberts 2002,^[10] who cited that the most stressful time for the fetus during labor is in active pushing phase of the second stage of labor. Prolonged pushing and breath holding can cause changes in maternal cardiovascular system and consequently uteroplacental perfusion, leading to acid base imbalance of the fetus and the development of fetal acidosis and hypoxia.

CONCLUSION

It is concluded from our study that;

1. There is less postpartum fatigue and perineal trauma in spontaneous pushing during the second stage of labor as compared to directed pushing technique.
2. The majority of the newborns in spontaneous pushing technique have higher APGAR score as compared to directed pushing.

RECOMMENDATIONS

1. Courses, seminars and conferences should periodically be planned for health professionals for

promoting the evidence based knowledge and skills about the tender issue of pushing techniques in the second stage of labor.

2. The pregnant women must be properly educated about the course and events of labor during antenatal classes. Simplified guidelines for them should be available, containing information about different stages of labor, effect of using different pushing techniques on the level of early postpartum fatigue and fetal outcome. They must be displayed in the labor ward suites.

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