

# The Outcomes of Delivery by Fundal Pressure Maneuver in the Second Stage of Labor

Parvin Asti<sup>\*1</sup>, Farahnaz Changaei<sup>1</sup>, Sohila PirdadehBeiranvand<sup>1</sup>, Shorangiz Beiranvand<sup>1</sup>

<sup>1</sup>Faculty of Nursing and Midwifery, Lorestan University of Medical Sciences, Khorramabad, Iran

---

*The use of uterine fundal pressure maneuver to assist pregnant women in the second stage of labor is a controversial issue. Therefore, the aim of this study is to detect the outcomes of delivery by fundal pressure in the second stage of labor. In this cross-sectional study, 166 women with uterine fundal pressure maneuver and 165 samples without uterine fundal pressure maneuver were delivered. Then, delivery outcome was evaluated in two groups. The results showed that the mean amounts of postpartum hemorrhage of the first 30 min were 681.144(385.2), and 280.2(377.87) in with uterine fundal pressure maneuver and without uterine fundal pressure maneuver groups, respectively. Frequency of episiotomy was in the with uterine fundal pressure maneuver group 21.7% and 1.2% in without uterine fundal pressure maneuver groups. The mean Apgar score in the first minute ( $7.66 \pm 1.07$  and  $8.63 \pm 0.93$ ) and fifth ( $9.74 \pm 0.61$  and  $9.92.0 \pm 0.65$ ) delivery in with uterine fundal pressure maneuver of without uterine fundal pressure maneuver groups was significantly lower, respectively ( $p < 0.001$ ). Rate of infants admitted in neonatal intensive care unit in with uterine fundal pressure maneuver groups was 28.3% and without uterine fundal pressure maneuver groups was 4.9%, respectively. The use of uterine fundal pressure maneuver increased the rate of maternal and neonatal complications. Therefore, physicians and midwives should make the decision about the appropriate use of uterine fundal pressure maneuver based on the patient's individual clinical circumstances.*

**Keywords:** Fundal pressure maneuver; Outcomes; Delivery; Second stage of labor

---

## Introduction:

In recent years, some interventions such as embryonic curvature, episiotomy, forceps, vacuum and uterine fundal pressure are applied for reducing the length of second stage of labor. Uterine fundal pressure maneuver (UFP) is one of the most controversial issues in scientific circles of midwifery in the world, which is extensively used by the gynecologists and midwives worldwide, but it is not recorded in patients' file for legal and moral considerations [1].

This maneuver was first proposed by Samuel Krestler, the German gynecologist, for the reduction of second stage of labor. In this maneuver, a mild pressure is imposed with the open wide palm at an angle of 30 -40 degrees relative to the mother's spine on the uterus to the pelvis in order to lower the fetus and shorten the second stage of labor. Uterine fundal pressure is done to help in ending the labor that increases intrauterine pressure. This maneuver is extensively used in the world for accelerating the second stage of labor.

---

\* Corresponding author: Parvin Asti  
Nursing and Midwifery Faculty, Lorestan University of Medical Sciences, Kamalvand Campus,  
Khorramabad, Iran; Telefax: 06633120140E-mail: [asti\\_par@yahoo.com](mailto:asti_par@yahoo.com)

DOI: [10.22087/ijac.2020.125327](https://doi.org/10.22087/ijac.2020.125327)

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Uterine fundal pressure maneuver is applied on mothers that received anesthetics, who are not able to strain at the second stage of labor, or in cases of reduced fetal heart pulse [3]. In addition, it is recommended in cases of attaching the electrode to the fetus scalp, amniotomy, dystocia of the shoulder and when the head of fetus is gravening and accelerating the delivery is essential [4-6].

Results of some studies have shown that uterine fundal pressure increases intrauterine pressure, and would bring about such maternal complications as second, third, and fourth-degree perineal and cervix injuries, postpartum hemorrhage, reversal and rupture of the uterus and peritoneum, hypotension, respiratory distress, liver and stomach rupture, amniotic fluid embolism, rib fracture, abdominal bruise, early ablation of the placenta, ... and fetal and infantile complications such as heart rate abnormalities, pressure on the umbilical cord, choking, intracranial hemorrhage, arm, thigh and fist fracture, seizure, paralysis, subcutaneous hematoma, fetal death and cerebral palsy following the rise of intrauterine pressure [2, 5, 10-13].

Findings of various studies in this regard have indicated that implementing this maneuver have some advantages and disadvantages, and there are controversy regarding the way of its application at the second stage of natural childbirth. Although the above complications may occur following a non-natural childbirth, using appropriate pressure on fundal uterine may increase intrauterine pressure, and facilitates exit of fetus at the second stage of the labor and it may be useful for some mothers [9-10].

Maternal and fetal outcomes resulting from fundal uterine pressure are not reported because of medical and legal problems; however, non-valid reports indicate these risks [5]. The current study was conducted with the aim of determining outcome of uterine fundal pressure maneuver delivery at second stage of labor during 2012 - 2014 in Asali Educational Hospital, Khoramabad.

## **Materials and Methods**

Three hundred and thirty one low risk pregnant women referring to delivery ward of Asali Hospital, Khoramabad, during 2012 - 2014 participated in this descriptive comparative research, purposive sampling method was used based on the inclusion criteria, until completion of the samples. Inclusion criteria in this research included women aged 18-35, delivery rates of 1-3, term pregnancy, single fetus, head presentation, normal delivery, live fetus and estimated infant weight of 2500-4000 (gr). Exclusion criteria included history of bleeding disorders, chronic diseases of the mother, preeclampsia, history of surgery on the uterine and pelvic, having indications for cesarean delivery, and lack of willingness to participate in the study.

In the research location, samples were hospitalized in the active stage of labor (dilation above 4 cm), and such measures as vaginal examination and administration of 1000 ml Lactated Ringer's serum and artificial rupture of membrane, if necessary, were performed.

The obstetrician midwife controlled the labor and the mother was transferred to the delivery room with the advent of the second stage of labor. In the absence of progression and fetal heart rate loss, uterine fundal pressure was used by the diagnosis of the doctor. Thus, 166 experienced uterine fundal pressure maneuver in their labor during the research, while 165 had labor without uterine fundal pressure.

The tool used for data collection in this study included a two-part questionnaire. The first part contained demographic characteristics, personal characteristics, maternity history, vital signs, and the second part contained information registration form, including length of active phase of the first stage of labor, from 4 cm dilatation or more, and second stage of labor, fetal heart rates, episiotomy, use of vacuum, delivery channel ruptures, estimated weight and first and second-minute Apgar score of infant, admission in the neonatal intensive care unit (NICU), and estimation of bleeding rate of third stage of labor by

weighing all of used pads through Saa Iran digital scale with a precision of 5 grams. Weight difference before and after was calculated in the first and second 30 minutes after departure of the placenta, every one gram of weight gain was considered as 1<sup>cc</sup> blood.

Data analysis was done using descriptive statistics including frequency, standard deviation, and inferential statistics including t-test, chi-square, and Fisher exact test.

## Results

Research participants were homogeneous in terms of personal characteristics and based on the inclusion criteria in two groups (Table 1).

Research findings showed that there is significant statistical difference in terms of mean bleeding volume in the first and second 30 minutes after delivery, episiotomy, and use of vacuum and perineal injuries in two groups (Table 2).

Research findings suggested that there is significant statistical difference in terms of mean first and fifth-minute Apgar score, fetal heart pulse rate at the second stage of labor, need for resuscitation, and hospitalization in NICU between two groups (Table 3).

## Discussion

Research findings indicated that first and second-degree ruptures, episiotomy, and use of vacuum were higher in uterine fundal pressure group compared to the group without uterine fundal pressure. Findings of most consistent studies support this fact [2, 4-6, 8, 12-14].

Other findings in this work showed that mean bleeding volume in the first and second 30 minutes after delivery was higher in uterine fundal pressure group compared to the group without uterine fundal pressure. Findings by Matsuo et al. indicated that uterine fundal pressure application increases risk of severe perineal injuries and bleeding volume after delivery [4]. Findings by Shimada et al. on clinical significance of delivery by uterine fundal pressure maneuver showed that bleeding volume increases following uterine fundal pressure at the second stage of labor [15]. Findings of this study are consistent with the current work. In the above-mentioned studies, the method of measurement of bleeding after delivery was not referred to, while bleeding after delivery was estimated in the current work by the digital scale with error level of 5 g, which can be a positive point in this regard.

Table 1. Maternal and neonatal characteristics of with and without uterine fundal pressure manoeuvre groups referring to Asali Hospital

Variable	With uterine fundal pressure maneuver (n=166) Frequency (%)	Without uterine fundal pressure maneuver (n=165) Frequency (%)	p Value
Age (year)	25.24(5.55)	25.24(5.47)	0.96 a
Gestational age (day)	277.88(7.91)	276.56(7.88)	0.85 a
Number of deliveries	1	131(78.91%)	0.26 b
	2	31(18.67%)	
	3	4(2.41%)	
Education	Illiterate	18(10.84%)	0.36 c
	High School, no degree	31(18.67%)	
	High School and Academic degree	40(24.09%)	
Occupation	Employed	16(9.63%)	0.39 b
	Housewife	150(90.36%)	
Newborn weight (g)	3311.32(361.56)	3321.57(387.38)	0.51 a
Diameter of the Newborn's head (cm)	34.33(1.10)	34.41(1.03)	0.16 a
Duration of the third stage of labor (min)	9.12(4.96)	9.96(5.69)	0.56 a

<sup>a</sup> Independent t test <sup>b</sup> Chi- square test <sup>c</sup> Fisher exact test

Table 2. Maternal complications in with and without uterine fundal pressure manoeuvre groups referring to Khoramabad Asali Hospital

Variable	With uterine fundal pressure maneuver (n=166) Frequency (%)	Without uterine fundal pressure maneuver (n=165) Frequency (%)	p Value	
Bleeding within the first 30 minutes after delivery (ml)	681.14(385.25)	280.21(377.87)	0.001a	
Bleeding within the second 30 minutes after delivery (ml)	156.163(163.84)	75.25(81.92)	0.001 a	
Use of vacuum	11(4.81%)	3(1.81%)	0.001 C	
Episiotomy	129(77.81%)	64(39%)	0.001 C	
Rupture	Grade 1	19(11.41%)	9(5.52%)	0.001 b
	Grade 2	36(21.73%)	8(5%)	
	Cervix rupture	3(3.42%)	0.00(0.00%)	0.56 a

<sup>a</sup> Independent t test <sup>b</sup> Chi- square test <sup>c</sup> Fisher exact test

Table 3. Neonatal complications in with and without uterine fundal pressure manoeuvre groups referring to Khoramabad Asali Hospital

Variable	With uterine fundal pressure maneuver (n=166) Frequency (%); Men(SD)	Without uterine fundal pressure maneuver (n=165) Frequency (%); Men(SD)	p Value
Fetal heart rate in the second stage of labor	114.92(12.3)	119.44(6.91)	0.001a
1-minute Apgar	7.66(1.07)	8.63(0.93)	0.001 a
5-minute Apgar	9.74(0.61)	9.92(0.65)	0.001 a
Newborn resuscitation	73(43.97%)	19(11.51%)	0.001 b
Admission in NICU	47(28.3%)	8(4.84%)	0.001 b
Clavicle fracture	1(6%)	0.00(00%)	0.56 b

<sup>a</sup> Independent t test <sup>b</sup> Fisher exact test

Mean first and fifth-minute Apgar score was higher in the group without uterine fundal pressure compared to the uterine fundal pressure group, and this difference was statistically significant. Findings of other studies in this regard showed that there is significant difference between two groups in terms of mean first-minute Apgar score. However, significant differences between two groups in terms of mean fifth-minute Apgar score was not reported [1, 3, 5, 6, 16-19]. Findings by Mahendru et al. showed no significant statistical difference between two groups in terms of mean first and fifth-minute Apgar score [14]. The above findings are consistent with finding on first-minute Apgar score in the current research, but there is a difference regarding fifth-minute Apgar score. Regarding first-minute Apgar score, it should be noted that breastfed infants that are in the

inappropriate birth conditions represent poor performance in the future in the cognitive tests [16, 19]. Moreover, investigation of findings by Mahendru et al. showed that transfer of newborn to the neonatal ICU is not associated with type of delivery [14], which is not consistent with the findings in the current study. In this study, the need for infant resuscitation and hospitalization in neonatal ICU was higher in uterine fundal pressure delivery group compared to natural delivery group.

## Conclusion

Using uterine fundal pressure at the second stage of labor increases adverse maternal, fetal, and neonatal outcomes. However, given the significance of extending physiologic delivery and reduction of resulting complications,

midwifery practitioners and delivery doctors should minimize non-necessary midwifery interventions for reduction of pain, fear, etc., and in case of need for intervention during second stage of labor, it is suggested that assisted delivery tools or cesarean delivery should be used given the disadvantages of this method.

### **Acknowledgment**

Research and Education deputy of Lorestan University of Medical Sciences as well as personnel of delivery ward of Asali Hospital, Khoramabad, are highly appreciated. This paper was extracted from a research plan numbered 1666 confirmed by research deputy of Lorestan University of Medical Sciences.

### **References:**

1. MerhiZO, Awonuga AO. The role of uterine fundal pressure in the management of the second stage of labor: a reappraisal. *Obstetrical & gynecological survey*. 2005;60(9):599-603.
2. Habek D, VukovićBobić M, Hrgović Z. Possible fetomaternal clinical risk of the Kristeller's expression. *Open Medicine*. 2008;3(2):183-6.
3. Tongate S, Gibbs JD. Nurses, Physicians and disagreements about fundal Pressure. *Nursing for women's health* 2010; 14(2):137-42.
4. Matsuo K, Shiki Y, Yamasaki M, Shimoya K. Use of uterine fundal pressure maneuver at vaginal delivery and risk of severe perineal laceration. *Archives of gynecology and obstetrics*. 2009; 280(5):781-6.
5. Simpson KR, Knox GE. Fundal pressure during the second stage of labor: Clinical perspectives and risk management issues. *MCN: The American Journal of Maternal/Child Nursing*. 2001; 26(2):64-71.
6. Simpson KR, Knox GE. Common areas of litigation related to care during labor and birth: Recommendations to promote patient safety and decrease risk exposure. *The Journal of perinatal & neonatal nursing*. 2003; 17(2):110-25.
7. Palmer J. Physiological pushing in the second stage of labour: The future for midwifery care. *Australian College of Midwives Incorporated Journal*. 1996; 9(3):15-20.
8. Verheijen EC, Raven JH, HofmeyrGJ. Fundal pressure during the second stage of labour. *The Cochrane Library*. 2009.
9. Buhimschi CS, Buhimschi IA, Malinow AM, KopelmanJN, Weiner CP. The effect of fundal pressure manoeuvre on intrauterine pressure in the second stage of labour. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2002; 109(5):520-6.
10. Tukur J, Omale A, Abdullahi H, Datti Z. Uterine prolapse following fundal pressure in the first stage of labour: a case report. *Annals of African medicine*. 2007; 6(4).
11. Murphy PA, CosnerKRR. Use of fundal pressure during second-stage labor. A pilot study. *Journal of nurse-midwifery*. 1996; 41(4):334-7.
12. Flamm BL. Shoulder dystocia and fundal pressure: A medical legal dilemma. *Journal of Healthcare Risk Management*. 2002; 22(2):9-14.
13. Greenwald LM, Mondor M. Malpractice and the perinatal nurse. *The Journal of perinatal & neonatal nursing*. 2003; 17(2):101-9.
14. Mahendru R, Malik S, Anand T. Age old practice of uterine fundal pressure in labor-more risky than beneficial. *Biomedical Research*. 2010; 21(3):295-6.
15. Shimada M, Suzuki S. Clinical significance of deliveries with uterine fundal pressure maneuver at a single perinatal center in Japan. *Journal of Clinical Gynecology and Obstetrics*. 2013; 2(1):10-4.
16. Odd DE, Rasmussen F, Gunnell D, Lewis G, Whitelaw A. A cohort study of low Apgar scores and cognitive outcomes. *Archives of Disease in Childhood-Fetal and Neonatal Edition*. 2008; 93(2):F115-F20.
17. Roberts J, Hanson L. Best practices in second stage labor care: maternal bearing down and positioning. *Journal of Midwifery and Women's Health*. 2007; 52(3):238-45.
18. Ibrahimzadehzagami S, Aghazadeh A. The outcome of delivery by fundal Pressure in the second stage of labor with spontaneous delivery. *Journal of Mashhad School of Nursing and Midwifery*. 2009; 9(1): 37-44.
19. Gennaro S, Mayberry IJ, Kafulafula U. The evidence supporting nursing management of labor. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*. 2007; 36(6):598-604.