American Journal of Nursing Research, 2017, Vol. 5, No. 4, 109-114
Available online at http://pubs.sciepub.com/ajnr/5/4/2

DOI:10.12691/ajnr-5-4-2

Effect of Manual Fundal Pressure during the Second Stage of Labor on Maternal Outcomes among Parturient Women

Hend S. Mohamed[1], Sahar. A. Elkheshen[2,*]

[1]Obstetrics and Gynecology Nursing, Faculty of Nursing Zagazig University
[2]Nursing Department, Faculty of Applied Medical Sciences, MUST University
*Corresponding author: saharelkheshen@yahoo.com

Abstract **Introduction**: Fundal pressure during the second stage of labour has been used to assist spontaneous vaginal birth and decrease second stage time or to avoid the need for operative delivery. **Aim:** to study the effect of manual fundal pressure during the second stage of labor on maternal outcome among parturient women.**Subjects and methods**: ***design***: A prospective, observational design was used. ***Sample***: 672 parturient women aged 20 to 35 years, pregnant in a singleton, living fetus presented by vertex with gestational age between 37 and 40 weeks, with uncomplicated pregnancies. ***Tools of data collection***: three tools used to collect data. ***Tool I:*** to collect characteristics of the study sample, ***tool II***: partogram to collect labor data and ***tool III***: birth outcome sheet. **Results**: about 63.1% of the study sample underwent performing uterine fundal pressure and the remaining (36.9%) delivered without fundal pressure. About 51.8% of women who delivered with fundal pressure had complications as cervical tears, vaginal tears and post partum hemorrhage. About 17.4 % of non fundal pressure cases delivered with the same complications. Duration of the second stage of labor was shorter in fundal pressure group than non fundal group (82.8% and 60.9% respectively). **Conclusion & Recommendation**: Women with fundal pressure experience more complications like vaginal and cervical tears compared to non fundal pressure cases. Maternity nurses should be aware about the benefits and risks of uterine fundal pressure technique during childbirth.

Keywords: *second stage of labor, manual fundal pressure, nursing implications, maternal outcomes*

Cite This Article: Hend S. Mohamed, and Sahar. A. Elkheshen, "Effect of Manual Fundal Pressure during the Second Stage of Labor on Maternal Outcomes among Parturient Women." *American Journal of Nursing Research*, vol. 5, no. 4 (2017): 109-114. doi: 10.12691/ajnr-5-4-2.

1. Introduction

Evidence based midwifery care uses the best available research on the safety and usefulness of specific practices to help direct maternity care decisions and facilitate optimal outcomes for mothers and their newborns [1]. Evidence is mounting that the care given to women during the second stage of labor directly impacts maternal and fetal outcomes [2,3]. Nurses are in a unique position to provide these care practices and to help childbearing women take informed choice based on evidence [4]. The role of the midwife in supporting care during pregnancy, birth, and the postpartum period is well established in many countries. Currently, the World Health Organization and the United Nations Population Fund recommend the leadership and involvement of a midwife or a nurse with midwifery skills in prenatal care as well as for the management of labor and vaginal birth [5].

The second stage of labor is a challenging phase for the birth attendant who must consider the objective aspects of labor progression as well as helping the woman to cope with the pronounced sensations and pain that accompany fetal descent and birth [6]. It can also be a challenge to provide appropriate care to a woman as there are conflicting opinions about the various aspects of care and strategies for achieving the best birth outcome for the mother as well as her newborn. During the second stage of labor, maternal pushing aid in fetal descent as the fetus completes the cardinal movements of labor, rotating and descending through the maternal pelvis [7].

Fundal pressure involves using the hands (manual fundal pressure) to push on the upper part of the uterus and down toward the birth canal [8].

It is used during the second stage of labour to shorten the labour and assist in vaginal birth, either as routine practice or due to presence of complications as fetal distress, collapse to progress, maternal overtiredness, or medical conditions that contradict with prolonged pushing maternal heart disease [9]. Potential risks with its use include uterine rupture, anal sphincter damage, newborn fractures or brain damage, and increased blood transfusion between the mother and her unborn baby [10,11].

The practice varies greatly between countries. Manual fundal pressure is frequently used in settings where other interventions, like instrumental deliveries, are not available, or cannot be performed because of lack of trained staff.

While in many low and middle-income countries the uterine fundal pressure used as routine practice during vaginal births [12,13].

Uterine fundal pressure is one of the most controversial maneuvers used in the second stage of labor [14]. Uterine fundal pressure can result in clinical variances between nurses and physicians [15].

Uterine fundal pressure used during the second stage of labor to decrease the length of labor and assist in vaginal birth, it may be used as routine practice or in cases of complications such as fetal distress, or maternal exhaustion, or medical conditions that contradict with prolonged pushing as the mother complaining from heart disease [16].

1.1. Significance of the Study

Despite a lack of evidence regarding fundal pressure efficiency and safety, it has been widely used by maternity care providers for many decades to shorten the length of the second stage of labor. This study was conducted to evaluate any benefit or harm for the mother and her baby underwent fundal pressure to enable nursing staff to apply the ideal management of the second stage which allow the greatest chance of spontaneous delivery with the least risk of maternal, fetal and neonatal morbidity and mortality**.**

1.2. Research question

Does fundal pressure have positive effect on the mother's outcome during labor process?

1.3. Research Hypothesis

Laboring women who underwent fundal pressure during the Second stage of labor exhibit more positive birth outcome than those who not underwent fundal pressure.

2. Subjects and Methods

2.1. Research Design

A prospective, observational design was used to accomplish the study.

2.2. Setting

The study was conducted in Maternity and Childhood Hospital at Zagazig University Hospitals.

2.3. Subjects

The sample size (672 parturient) was taken according to daily admission flow rate (30-38 cases \ day), during the study period.

2.4. Inclusion Criteria

Primiparous and multiparous women aged between 20 and 35 years, pregnant in a singleton, living fetus presented by vertex with gestational age between 37 and 40 weeks and no medical or obstetric complications which may affect the progress of labor.

2.5. Tools of Data Collection

Data collection was done through the use of the following three tools: **Tool (I): A structured Interview Sheet:** A structured interview sheet was designed to collect data from parturient women in both groups about the following:

- **Part 1: Socio-demographic data such as:** age, occupation and education level.
- **Part 2: Current pregnancy and labor data as:** weeks of gestation and the symptoms of the onset of labor.

- **Tool (II): Physical Assessment and Observation during labor Sheet (partogram):** This sheet was used by the researcher to collect data about the following: maternal vital signs, anthropometric measurements, uterine contractions, number and duration of each contraction, fetal heart rate, station at full cervical dilation, mode of rupture of membrane and the color of amniotic fluid.
- **Tool (III):** Birth Outcome Sheet: Maternal Outcome parameters are episiotomy, cervical, genital tract trauma and post partum hemorrhage.

2.6. Field Work

Collection of data covered a period of three months "from the first of March 2017 to the end of May 2017". After getting the official permission, the researcher attended labor ward the three hot days (Saturday, Monday and Wednesday) per week during morning and afternoon shifts. She filled the interviewing questionnaire sheet individually, after explaining the purpose of the study. Each interview took about 5-10 minutes. General, abdominal and vaginal examinations were done by the on duty physician. The researchers just observed the course of labor without any interference.

When parturients were admitted to obstetric ward and met the inclusion criteria, the local hospital guidelines were followed by the on duty team conducting all deliveries. Oxytocin and vaginal Misoprostol was used for induction or augmentation during the first stage of labor. With the onset of the second stage of labor the oxytocin infusion was stopped. Uterine fundal pressure was then applied manually by obstetricians with one of the following modes: forearm and elbow, fist of one hand, palm of one hand or combined. The obstetrician pressed on the uppermost part of the uterus at a 30–45° angle to the maternal spine in the direction of the pelvis concomitant with each uterine contraction until delivery of the fetal head. In this research mean of the number of FP was 3 times and mean of the duration of FP found 58seconds.

2.7. Administrative and Ethical Considerations

An official permission was obtained from the Faculty of Nursing Dean. Also, an approval from the Research Committee at the Faculty of Nursing was obtained. An

official permission was granted by submission of an official letter from the Zagazig Faculty of Nursing to the responsible authorities of the study setting to obtain their permission for data collection. All ethical issues were taken into consideration during all phases of the study: the research maintained an anonymity and confidentiality of the subjects. The inclusion in the study was totally voluntary. The aim of the study was explained to every woman before participation and an oral consent was obtained. Women were notified that they can withdraw at any stage of the research; also they assured that the information obtained during the study will be confidential and used for the research purpose only.

2.8. Statistical Design

After the collection of data, it was revised, coded and fed to statistical software SPSS version 16. Chi square test was used; a chi square statistic is a measurement of how expectations compare to results. The data used in calculating a chi square statistic must be random, raw, mutually exclusive, drawn from independent variables and drawn from a large enough sample. The smaller the p-value obtained, the more significant is the result, the p-value being the probability of error of the conclusion.

3. Results

Figure 1 revealed that among 672 normal vaginal deliveries 428(63.1%) women underwent performing uterine fundal pressure.

Table 1 revealed that mothers delivered with fundal pressure and who delivered without fundal pressure (42% and 39.1% consequently) was weighting more than 80 kgm and less than 90kgm. There was no statistical significance differences regarding parity, gestational age and cervical dilatation on admission between women delivered with or without fundal pressure.

Regarding cervical effacement on admission the table revealed that 71 % of women who delivered with uterine fundal pressure experiencing cervical effacement less than 50% while on the other hand 87.1% of the women delivered without fundal pressure experiencing cervical effacement of more than 50% on admission. Statistically there was significance difference.

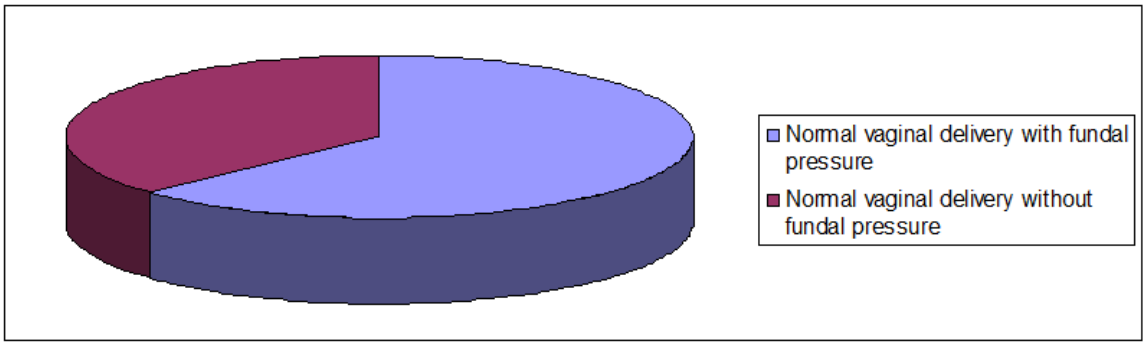

Figure 1. No and percentage distribution of the study sample regarding performance of fundal pressure

Table 1. Mothers` characteristics of the study sample (n=672)

Mothers characteristics	Vaginal delivery with fundal pressure		Vaginal delivery without fundal pressure		Chi square	P value
	No	%	No	%		
Weight:						
60- >70	102	24.1	52	21.3	8.510	0.037
70-> 80	140	33.0	89	35.9		
80-> 90	178	42.0	97	39.1		
90-100	4	0.9	10	4.0		
parity:						
Primiparous	157	37	80	23.3	1.560	.242
Multiparous	271	63	168	67.7		
Gestational age:						
36-> 37 weeks	21	5	13	5.2	3.132	0.372
37-> 38 weeks	50	11.8	25	10.1		
38-> 39 weeks	114	26.8	82	33.1		
39-40 weeks	239	56.4	128	51.6		
Cervical dilatations on admission:						
3 cm	157	37	91	36.7	0.008	1.00
5 cm	267	63	157	63.3		
Cervical effacement on admission:						
50% effaced	301	71	32	12.9	211.206	**0.000**
Full effaced	123	29	216	87.1		

Table 2. Labor parameters of the study sample (n=672)

Parameters	Vaginal delivery with fundal pressure		Vaginal delivery without fundal pressure		Chi square	P value
	No	%	No	%		
Methods of augmentation:						
Oxytocin	301	71	183	73.8	.609	0.467
Vaginal tablets	123	29	65	26.2		
Duration of second stage of labor:						
0.5-< 1 hour	351	82.8	151	60.9	39.697	0.000
1-1.5	73	17.2	97	39.1		
Duration of third stage of labor:						
20- <30 minute	119	28.1	221	89.2	261.369	0.000
More than 30 minute	305	71.9	27	10.8		

Table 3. Maternal outcome of the study sample (n=672)

Outcome	Vaginal delivery with fundal pressure		Vaginal delivery without fundal pressure		Chi square	P value
	No	%	No	%		
Episiotomy	206	48.6	205	82.7	672.000	0.000
Complications:						
Vaginal tears	58	13.6	36	14.5	110.296	0.000
Cervical tears	135	31.8	1	0.4		
Presence of post partum Hemorrhage.	25	5.8	6	2.5		
No complications	206	48.8	205	82.6		

Table 2: Illustrate that, the majority of women in both groups had augmentation of labor by oxytocin drugs, but more women in the uterine fundal pressure group had augmentation by vaginal tablets (71.0% & 73.8.0% vs. 29.0% & 26.2%). Meanwhile, the duration of the second stage of labor 0.5-1 hour in the uterine fundal pressure group was shorter than none pressure group (82.8% vs. 60.9%), with statistically difference (p=0.000).

Table 2 revealed that there was no significance difference regarding method of augmentation for both women who delivered with fundal pressure and who delivered without fundal pressure. Duration of the second stage of labor was less than 1 hour for 82.8% of women who delivered with fundal pressure and was 60.9% of women who delivered without fundal pressure. Statistically there was significant difference.

Table 2 also showed that duration of third stage of labor was less than 30 minutes in the majority of women who delivered without fundal pressure (89.2%) and was more than 30 minutes in the majority of women who delivered with fundal pressure (71.9%). Statistically there was significant difference.

Table 3 showed that women in the uterine fundal pressure group had more percentage of cervical tears (31.8% vs. 0.4 %,) and postpartum hemorrhage (5.8 % vs. 2.5 %,) compared to women with no uterine pressure group. The table points to a difference of statistical significance between parturient in the two study groups (p=0.000).

Table 3 revealed that women who delivered without fundal pressure have higher incidence of episiotomy rate than women who delivered with fundal pressure (82.7% and 48.6% consequently).

Table 3 revealed that 82.6 % of women who delivered without fundal pressure delivered without complications while 51.8% of women who delivered with fundal pressure have complications as cervical tears (31.8%), vaginal tears (13.6%) and post partum hemorrhage (5.8%).

Table 4 revealed that fundal pressure was performed for women weighting 70 to less than 80 kgm and weighting 80 to less than 90 kgms (33% and 42 % consequently), also the table revealed that fundal pressure was performed on large scale on multiparous women (63%) rather than primiparous (36%). Statistically there was significance difference.

Table 4. Relation between maternal weight and parity regarding fundal pressure

	Fundal pressure group N= 424		**Chi**	**P value**
	No	**%**		
Weight:				
60- <70	102	24.1	158.113	0.000
70-<80	140	33		
80-<90	178	42		
90-100	4	0.9		
Parity:				
Primiparous	157	37	28.538	0.000
Multiparous	267	63		

4. Discussion

The second stage of labor is a period of increased risk for both mother and fetus**.** Since the beginnings of the 20th century, women in the second stage of labor have been exhorted to strenuously push their babies into the world.The second stage of labor is the stage of pushing, during which the cervix is fully dilated up to 10 cm. Applying fundal pressure by pushing on the mother's abdomen towards the birth canal is often used to assist

vaginal birth, decrease the length of the second stage and lessen the need for instrumental birth [2]. The role of the nurse midwife in providing care during pregnancy, birth, and the postpartum period is well instituted in many countries. Currently, the World Health Organization and the United Nations Population Fund recommend involvement of a nurse with midwifery skills in prenatal care and for the management of labor and vaginal birth as well [17].

This study aimed at studying the effect of performing fundal pressure on maternal and fetal outcomes. The study sample consisted of 672 women undergone normal vaginal delivery.

The present study revealed that, the incidence of fundal pressure in this study was 63.1% among the study sample which consisted of 672 parturient women. Moiety FM, & Azzam AZ, [18] found in their study on 8097 parturient women that the prevalence of fundal pressure was 24.38%.

Duration of second stage of labor among women who delivered with fundal pressure was shorter than its duration among women who delivered without fundal pressure. Moiety FM & Azzam AZ, and Olus Api & Murat Api, [18,19] found that fundal pressure lessens the duration of the second stage of labor. Similarities between the above mentioned results could be attributed to the use of the same technique of uterine fundal pressure. Prolonged duration of second stage of labor was associated with increased risks of birth asphyxia-related complications and admission to NICU [20]. In a pilot study performed by Mahendru, [21] on manual fundal pressure compared with standard care in 209 nulliparous women with uncomplicated pregnancies in a hospital in India found no significant reduction in the duration of the second stage of labour.

Reducing genital tract trauma in childbirth is a priority for parturient women and for maternity nurses. Such trauma can cause both short term problems "blood loss, need for suturing and perineal pain" and long term problems "extended pain and various functional difficulties; such as bowel, urinary and sexual problems" for new mothers and may pose therapeutic challenges for caregivers. The results of the present study revealed a significant increase in the rate of episiotomy, perineal tears among women who delivered with using fundal pressure. Sartore A, et al, [22] found in his study on 522 primiparous women that using fundal pressure technique increases the rate of episiotomies among their study sample. Also Graham ID, etal, [23] reported rates of the episiotomy around the world ranges from as low as 9.7% in Sweden to 100% in Taiwan. In some settings such as Argentina, episiotomy is routine for almost all women having their first delivery [24].

Regarding perineal lacerations, the results revealed that there were both vaginal and cervical tears among women who delivered using fundal pressure technique compared with women who delivered without the use of fundal pressure. Matsuo et al, [10] and Masoumeh et al [26], found that Uterine fundal pressure during the second stage of labour increased the risk of perineal laceration. Pan HS, et al [24] & De Leeuw JW, et al, [25] said that there is a risk of uterine rupture, anal sphincter damage and severe perineal lacerations. Koji Matsuo et al on his study on Six hundred sixty-one vaginal deliveries found that uterine fundal pressure maneuver did not increase the risk of cervical laceration and vaginal laceration [27].

The difference among a variety of studies on maternal complications ascribed to the variations in medical and nursing interventions used during labor.

5. Conclusion

Women with fundal pressure experience more complications like vaginal and cervical tears compared to non fundal pressure cases. There is insufficient evidence to make conclusions on the positive or unsafe effects of fundal pressure. Available studies are not enough to make generalization about its use.

Documentation of fundal pressure when applied with clear indication seems to be the first step towards effective using of fundal pressure in the obstetrical practice.

6. Recommendation

Maternity nurses should be aware about the benefits and risks of uterine fundal pressure technique during childbirth and should encourage the parturient women to push spontaneously during the second stage of labor to achieve better birth outcome. There is a need for objective evaluation of the effectiveness and safety of fundal pressure in the second stage of labor.

References

[1] Hofmeyer GJ.. Evidence-based intrapartum care. Best Pract. *Res. Clin. Obstet. Gynaecol*; 2005; 19(1): 103-115.

[2] Hofmeyr G, Vogel JP, Cuthbert A, Singata M, 2017. Fundal pressure during the second stage of labour for improving maternal and fetal outcomes. Cochrane Database of Systematic Reviews 2017, Issue 3. Art. No.: CD006067.

[3] Bloom SL., Casey BM., Schaffer JI., McIntire DD. & Leveno KJ.. A randomized trial of coached versus uncoached maternal pushing during the second stage of labor. *Am J Obstet Gynecol;* 2006; 194(1): 10-13.

[4] Romano AM. & Lothian JA.: Promoting, Supporting, and Protecting Normal Birth: A look at the evidence .*JOGN Nurs*. 2008; 37(1): 95.

[5] Silvana Granado Nogueira da Gama, Elaine Fernandes Viellas, Jacqueline Alves Torres, Maria Helena Bastos, Odaléa Maria Brüggemann, Mariza Miranda Theme Filha, Arthur Orlando Correa Schilithz, and Maria do Carmo Leal 2016. Labor and birth care by nurse with midwifery skills in Brazil. Reprod Health. 2016; 13(Suppl 3): 123.

[6] Lisa Hanson. Second-Stage Labor Care Challenges in Spontaneous Bearing Down. J Perinat Neonat Nurs. 2009; Vol. 23, No. 1, pp. 31-39.

[7] Anderson BA. & Stone S.: *Best Practices in Midwifery: Using the Evidence to Implement Change*. Springer Series. 1st edition; chapter 35, 2012, Springer Publishing Company: 757-803.

[8] Hsieh CH. To Push or Not to Push? Reflections on the Uterine Fundal Pressure Application in the Second Stage of Labor. Hu Li Za Zhi. 2016 Aug; 63(4): 123-7.

[9] G. Justus Hofmeyr, Mandisa Singata, Theresa Lawrie, Joshua P. Vogel, Sihem Landoulsi, Armando H. Seuc, and A. Metin Gülmezoglu. A multicentre randomized controlled trial of gentle assisted pushing in the upright posture (GAP) or upright posture alone compared with routine practice to reduce prolonged second stage of labour (the Gentle Assisted Pushing study): study protocol. Reprod Health. 2015; 12: 114.

[10] Matsuo K, Shiki Y, Yamasaki M, Shimoya K. Use of uterine fundal pressure manoeuver at vaginal delivery and risk of severe perineal laceration. Arch Gynecol Obstet. 2009; 280: 781-6.

[11] Matsubara S, Mita F, Kikkawa I, Suzuki M. Maternal rib fracture after manual uterine fundal pressure. Rural Remote Health. 2012; 12: 2062.

[12] Goldman N, Glei D. Evaluation of midwifery care: results from a survey in rural Guatemala. Soc Sci Med. 2003; 56(4): 685-700.

[13] Declercq ER, Sakala C, Corry MP, Applebaum S. New York: childbirth connection. Listening to mothers II: report of the second national U.S. Survey of women's childbearing experiences. J Perinat Educ. 2007; Fall; 16(4): 9-14.

[14] Merhi ZO1, Awonuga AO. The role of uterine fundal pressure in the management of the second stage of labor: a reappraisal. Obstet Gynecol Surv. 2005 Sep; 60(9): 599-603.

[15] Simpson KR1, Knox GE, Martin M, George C, Watson SR. 2011. Michigan Health & Hospital Association Keystone Obstetrics: a statewide collaborative for perinatal patient safety in Michigan. Jt Comm J Qual Patient Saf. 2011 Dec; 37(12): 544-52.

[16] Kaori Baba, Yaeko Kataoka, Kaori Nakayama, Yukari Yaju, Shigeko Horiuchi, and Hiromi Eto. A cross-sectional survey of policies guiding second stage labor in urban Japanese hospitals, clinics and midwifery birth centers. BMC Pregnancy Childbirth. 2016; 16: 37.

[17] World Health Organization. WHO: nursing and midwifery progress report, 2008-2012. [Internet] 2013.

[18] Moiety FM, Azzam AZ. 2014. Fundal pressure during the second stage of labor in a tertiary obstetric center: a prospective analysis. J Obstet Gynaecol Res. 40(4): 946.

[19] Olus Api & Murat Api Department of Obstetrics & Gynecology, Haseki Education and Research Hospital, Istanbul, Turkey. Uterine fundal pressure and duration of the second stage of labor: A randomized controlled trial. Pages 1297-1298 Received 21 Jul 2009, Accepted 28 Jul 2009, Published online: 10 Nov 2009.

[20] A Sandström, M Altman, S Cnattingius, S Johansson, M Ahlberg and O Stephansson. Durations of second stage of labor and pushing, and adverse neonatal outcomes: a population-based cohort study. Journal of Perinatology (2017) 37, 236-242.

[21] Mahendru R. Shortening the second stage of labor? J Turk Ger Gynecol Assoc. 2010; 11(2): 95-8.

[22] Sartore A1, De Seta F, Maso G, Ricci G, Alberico S, Borelli M, Guaschino S. The effects of uterine fundal pressure (Kristeller maneuver) on pelvic floor function after vaginal delivery. Arch Gynecol Obstet. 2012 Nov; 286(5): 1135-9.

[23] Carroli G, Mignini L. Episiotomy for vaginal birth. Cochrane Database Syst Rev. 2009; 1: CD000081.

[24] Pan HS, Huang LW, Hwang JL, Lee CY, Tsai YL, Cheng WC. Uterine rupture in an unscarred uterus after application of fundal pressure: a case report. J Reprod Med. 2002; 47(12): 1044-6.

[25] De Leeuw JW, Vierhout ME, Struijk PC, Hop WC, Wallenburg HC. Anal sphincter damage after vaginal delivery: functional outcome and risk factors for fecal incontinence. Acta Obstet Gynecol Scand. 2001; 80(9): 830-4.

[26] Masoumeh Abedzadeh-Kalahroudi, Ahmad Talebian, Mohammad Jahangiri, Elaheh Mesdaghinia, and Mahdi Mohammadzadeh. Incidence of Neonatal Birth Injuries and Related Factors in Kashan, Iran. Arch Trauma Res. 2015 Mar; 4(1).

[27] Koji Matsuo, Yasuhiko Shiki, Masato Yamasaki and Koichiro Shimoya. Use of uterine fundal pressure maneuver at vaginal delivery and risk of severe perineal laceration. Archives of Gynecology and ObstetricsNovember 2009, Volume 280, Issue 5, pp 781-786.