Available online at www.scholarsresearchlibrary.com

Scholars Research Library
Annals of Experimental Biology, 2023, 11 (2): 68-74
(http://www.scholarsresearchlibrary.com)

ISSN:2348-1935

Maternal Outcomes of Induced Versus Spontaneous Labor among Admitted Women in Delivery Room at Maternity Teaching Hospital in Erbil City: A Comparative Study

Awaz A. Saeed[1*] and Bewar H.Noori[2]

[1]*Assistant Professor. Ph.D. Maternal and Neonatal Nursing, Nursing department/ Hawler Medical University. Nursing College, Erbil, Iraq*

[2]*Assistant Lecturer, Msc Maternal and Neonatal Nursing, Azady Hospital / Ministry of Health, Kirkuk, Iraq*

***Corresponding Author:** Awaz A. Saeed, Assistant Professor. Ph.D. Maternal and Neonatal Nursing, Nursing Department/ Hawler Medical University. Nursing College, Erbil, Iraq.*

E-mail: awaz_zz@yahoo.com

***Received:** 28 March, 2023, Manuscript no. aeb-23-93249; **Editor assigned:** 29 March, 2023, Pre QC no. aeb-23-93249 (PQ); **Reviewed:** 31 March, 2023, QC no. aeb-23-93249 (Q); **Revised:** 03 April, 2023, Manuscript no. aeb-23-93249 (R); **Published:** 10April, 2023*

ABSTRACT

***Background and Objective**: Induction of labor refers to the stimulation of contractions before the labor starts spontaneously, with or without ruptured membranes. The present study aimed to compare the maternal outcomes of induced versus spontaneous labor.*

***Methodology**: A comparative study was conducted in Maternity Teaching Hospital in Erbil city from February 2020 to February 2021. Using purposive (non-probability) sampling techniques, 240 pregnant women (120 with induced labor and 120 with spontaneous labor) were recruited into the study. Through direct interviews, a proper researcher-designed questionnaire was utilized to collect the required data. The collected data were analyzed using descriptive and inferential statistical approaches.*

***Results**: There were significant to highly significant differences between the two delivery methods in terms of maternal outcomes, emergency cesarean section, postpartum blood loss, need for blood transfusion, uterine atony, perennial laceration, and postpartum hospital stay.*

***Conclusion** There was the significance to a highly significant difference in maternal outcomes between induced and spontaneous labor.*

Keywords: Induction of labor; Spontaneous labor; Outcome

INTRODUCTION

Spontaneous labor refers to birth without clinical intervention and the pregnant women do not have induction of labor, epidural anesthesia, spinal anesthesia, general anesthesia, assisted vaginal delivery (with forceps and/or ventouse), and cesarean delivery. Women will experience spontaneous labor if they do not take prostaglandins, oxytocin, artificial rupture of membrane, or balloon catheters for labor induction [1].

Induction of labor is a procedure used to stimulate uterine contractions during pregnancy before labor begins on its own, and it initiates when a birth benefits the mother or the fetus and compensates for the risks of a continuing pregnancy [2]. Induction of labor often begins with cervical ripening which includes softening and loosening of the cervix in the preparation for labor and delivery [3]. Cervical ripening is defined as the precursor to the onset of labor, in which the cervix becomes soft, either naturally or as a result of physical or pharmacological interventions [4].

Indications for induction of labor include postdate, gestational hypertension, chorioamnionitis, premature rupture of membrane, preeclampsia, maternal conditions (e.g., chronic hypertension and diabetes mellitus), and neonate conditions (e.g., oligohydramnios and severe neonate growth restriction) [5,6]. Both pharmacological (prostaglandins and oxytocin) and mechanical (balloon catheters) agents are used for the induction of labor [7]. When these methods are used individually, the incidence of cesarean delivery decreases in women undergoing induction [8]. Oxytocin, the hormone that stimulates uterine contractions, is less effective in cervical ripening and is usually used alone to induce labor when the cervix is favorable (Bishop's degree >6) or after cervical ripening by prostaglandins or mechanical methods [9]. Misoprostol (prostaglandin E1 analog) is broadly used to induce

labor [6]. Induction of labor brings about many potential complications for mothers and newborns, while mechanical methods are associated with the fewest number of harmful effects [9].

Women undergoing induction of labor may be at a higher risk of cesarean section [10]. Pharmacological methods of induction of labor are associated with possible risks, such as uterine tachysystole with or without changing the neonate heart rate, uterine rupture, fetus distress, and maternal morbidity and mortality. The incidence of these adverse events is dependent on the agent used for induction, dose, and other factors [11]. Induction of the postdate is associated with an increased risk of overall C/S due to failure to progress, chorioamnionitis, labor dystocia, uterine rupture, reduced risk of developing oligohydramnios, and meconium-stained amniotic fluid. Induction of labor does not cause postpartum hemorrhage, shoulder dystocia, or meconium aspiration [12]. Induction of labor at 39 weeks of gestation results in lower rates of cesarean delivery, maternal morbidity, newborn morbidity, stillbirths, and newborn deaths [13].

Induction of labor represents the most common interventional procedure in obstetrics. It is applied in 20% to 25% of all pregnancies in Korea [14]. The prevalence of induction of labor in Finland is very low compared to other developed countries, and the rate of successful induction in Finland is slightly higher than in Ethiopia but is comparable to regional rates when induction failure is very low compared to local and regional institutions. Bishop score, which is based on cervical favourability before induction, has been used to predict whether induction of labor leads to a successful vaginal delivery or not. The low cervical score has been associated with failure of induction, prolonged labor, and a high rate of cesarean deliveries [15]. Bishop's score is a remarkable predictor of the success of induction [16]. In the United States of America and the United Kingdom, about 23% of all deliveries are by induction of labor, while the counterpart figure in Latin America is 11.4% [17].

MATERIALS AND METHODS

Using a quantitative comparative design, the present study was conducted among full-term pregnant women admitted to the Maternity Teaching Hospital in Erbil city from February 2020 to February 2021. The ethical approval has been obtained from the ethical approval committee of Hawler Medical University /Nursing college that consists of (Assistant .Prof DR. Siyamand Hasan Muhedin, ,Assistant.Prof DR..Runak Neamatulla Husin, L.DR..Zhyan Abdulla, L.Salar Saidi Husin, L.Banaz sediq Smail) and the head of committee (Assistant Prof. Dr.Abdulqader Husin) Then a verbal consent has been obtained from the samples after informed them about the questionnaire items, We didn't need written consent from participants because we dealing with them by asking questions they answer after getting agreement from them this is allowed by our university, the ethical committee in nursing college(Assistant .Prof DR. Siyamand Hasan Muhedin, Assistant.Prof DR..Runak Neamatulla Husin, L.DR..Zhyan Abdulla, L.Salar Saidi Husin, L.Banaz sediq Smail) and the head of committee (Assistant Prof. Dr.Abdulqader Husin) approved that , in case of dealing with participants by drugs ,substances, herbal and some kinds of food need written consent. The guidelines outlined in the Declaration of Helsinki were followed so the participants to didn't expose themselves to any risk. The sample size was determined by power and sample size estimation software (Version 3.0.43). For this purpose, the following data were fed into the software: The rate of vaginal delivery which was set at 83.6% and 67.6% among the spontaneous labor group and the induction group, respectively, the alpha error that was set at 0.05, and the beta error that was set at 20% (power 80%) [18]. Accordingly, the estimated sample size was 112 women in the spontaneous labor group and 112 women in the induced labor group. Therefore, 240 women have recruited: 120 women for the induced group and 120 for the spontaneous group. The inclusion criteria were live singleton fetus, vertex presentation, gestational age after 37 gestational weeks, cases indicated induction of labor (in the induced group), and uncomplicated cases (convulsion, severe bleeding, and shock). The exclusion criteria were mal-presentation, abnormal placentation, intrauterine neonate death, gestational age less than 37 gestational weeks, women who did not have a chronic disease or any medical problems, previous cesarean section, uncooperative patient, and multiple pregnancies. Required data were gathered through a proper questionnaire aimed at collecting data on the pregnant women's socio-demographic characteristics. The questionnaire consisted of two sections. Section 1 was used to gather data on the pregnant women's demographic characteristics, including age (classified into 16-23, 24-31, 32-39, and >40 age groups), educational level (including illiterate, able to read and write, primary school, secondary school, and college or institute), residency (including urban, suburban, and rural), occupation (including government employee, private employee, self-employment, student, and housewife), income, smoking, and secondary smoker. Section 2 was utilized to collect data on anthropometric measurement, BMI according to the World Health Organization (WHO, 2011) (BMI was classified as follows: Underweight<18.5 kg/m^2, Normal weight 18.5 kg/m^2-24.9 kg/m^2, Overweight 25.0 kg/m^2-29.9 kg/m^2, Moderate obesity (class I) 30.0 kg/m^2 – 34.9 kg/m^2, Severe (gross) obesity (class II) 35.0 kg/m^2-39.9 kg/m^2, and Very severe (morbid) obesity (class III) ≥ 40 kg/m^2), and maternal outcomes (including emergency cesarean section delivery, blood loss , need for blood transfusion, uterine atony, need for uterotonics after delivery, perennial laceration, postpartum stay in the hospital, admission to ICU, hysterectomy, and status at discharge).

RESULTS

Table 1 shows the demographic data obtained from the study participants with induced and spontaneous labor. As indicated, about half of the induced group (49.1%) was aged between 16 years and 23 years, and 43.3% of the spontaneous group was aged between 24 years and 31 years. Regarding the educational level, 26.6% of the women in the induced group were primary school graduates, and 30% in the spontaneous group were illiterate. Most of the women in the induced group 45% lived in rural areas, and 43.3% in the spontaneous group lived in urban areas. Regarding their occupation, most of the women in both study groups (97.5%) were housewives. The results revealed that 76.7% of women in the induced group and 70% in the spontaneous group were not satisfied with

their income. Regarding their BMI, 34.2% of the women in the induced and spontaneous groups were overweight. In terms of their smoking status, non-smokers made up the majority proportion (96.7%) of the induced women and 100% of the spontaneous women; however, 50.8% of the women in the induced group and 63.3% in the spontaneous group were secondary smokers.

Table 1. Distribution of the sociodemographic characteristics of the study sample (n= 240)

Characteristics	Induced labor		Spontaneous labor	
	f	%	f	%
Age				
16 years-23 years	59	49.1	31	25.8
24 years-31 years	33	27.5	52	43.3
32 years –39 years	26	21.7	32	26.7
40 and more years	2	1.7	5	4.2
Total	120	100	120	100
Level of education				
Illiterate	28	23.3	36	30
Able to Read and Write	17	14.2	19	15.8
Primary School	32	26.6	35	29.2
Secondary School	26	21.7	20	16.7
College or Institute	17	14.2	10	8.3
Total	120	100	120	100
Residency				
Urban	35	29.2	52	43.3
Suburban	31	25.8	27	22.5
Rural	54	45	41	34.2
Total	120	100	120	100
Occupation				
Government Employee	1	0.8	3	2.5
Student	2	1.7	0	0
Housewife	117	97.5	117	97.5
Total	120	100	120	100
Income				
Satisfied	28	23.3	36	30
Non-satisfied	92	76.7	84	70
Total	120	100	120	100
MBI				
Underweight	0	0	0	0
Normal Weight	14	11.7	20	16.6
Overweight	41	34.2	41	34.2
Obesity	40	33.3	38	31.7
Morbid Obesity	25	20.8	21	17.5
Total	120	100	120	100
Smoking				
Yes	4	3.3	0	0
No	116	96.7	120	100
Total	120	100	120	100
Secondary Smoking				
Yes	59	49.2	44	36.7
No	61	50.8	76	63.3
Total	120	100	120	100

Table 2 shows the differences between maternal outcomes regarding methods of labor (induced and spontaneous labor). There was significance to a highly significant difference between the scores of the items of the maternal outcomes (Emergency C/S, vital signs, Amount of blood loss after delivery, blood transfusion needed, number of blood pints, Uterine atony, perennial laceration, postpartum stay) with regards to the method of delivery (induced and spontaneous labor) except the items; (postpartum uterotonic use, ICU admission, admission causes, hysterectomy, and pt. discharge status) which they have not computed because the similar answer in both groups.

Table 2. Difference between the methods of labor (induced and spontaneous labor) regarding maternal outcomes by chi-square test

Maternal Outcomes	Induced labor		Spontaneous labor		chi-square value	p-value
	f	%	f	%		(Sig)
Emergency C/S						

Yes	16	13.3	0	0	16	<0.001 HS
No	104	86.7	120	100		
Total	120	100	120	100		
Pulse beats/min.						
70-80	39	32.5	57	47.5	5.857	0.021
81-91	43	35.8	36	30		S
92-102	38	31.7	27	22.5		
Total	120	100	120	100		
Temperature°C						
36-37	43	35.8	83	69.2	26.734	<0.001 HS
37.1-38.1	77	64.2	37	30.8		
Total	120	100	120	100		
Blood Pressure						
Hypotension	37	30.8	3	2.5	93.995	<0.001 HS
Normal BP.	44	36.7	115	95.8		
Hypertension	39	32.5	2	1.7		
Total	120	100	0	0		
Amount of blood loss after delivery						
<500 ml	57	47.5	103	85.8		
500 ml-999 ml	39	32.5	15	12.6	42.872	<0.001 HS
1000 ml -1499 ml	1	0.8	0	0		
1500 ml-1999 ml	10	8.3	1	0.8		
2000 ml -2499 ml	7	5.8	0	0		
2500 ml -2999 ml	6	5.1	1	0.8		
3000 ml + more	0	0	0	0		
Total	120	100	120	100		
Blood Transfusion Needed						
Yes	23	19.2	2	1.7		
No	97	80.8	118	98.3	19.691	<0.001 HS
Total	120	100	120	100		
No. of Blood Pints						
No Pint	97	80.8	118	98.3		
1 Pint	16	13.3	2	1.7	19.94	<0.001 HS
2 Pints	6	5.1	0	0		
3 Pints	1	0.8	0	0		
Total	120	100	120	100		
Uterine atony						
Yes	18	15	0	0		
No	102	85	120	100	19.459	<0.001 HS
Total	120	100	120	100		
Postpartum Uterotonic Use						
Yes	120	100	120	100		
No	0	0	0	0	.	NC
Total	120	100	120	100		
Perennial Laceration						
1st Degree	21	17.5	21	17.5		
2nd Degree	17	14.3	7	5.8		
3rd Degree	31	25.8	9	7.5		
4th Degree	22	18.3	3	2.5	94.975	<0.001 HS
No Laceration	13	10.8	80	66.7		
C/S	16	13.3	0	0		
Total	120	100	120	100		
Postpartum Stay						
< 12 hours	55	45.8	118	98.3		
12 hours	20	16.7	0	0		
24 hours	25	20.8	2	1.7	82.535	<0.001 HS
> 24 hours	20	16.7	0	0		
Total	120	100	120	100		
ICU Admission						

Yes	0	0	0	0		
No	120	100	120	100	.	NC
Total	120	100	120	100		
Causes of ICU Admission						
No Causes	120	100	120	100	.	
Total	120	100	120	100		NC
Hysterectomy						
Yes	0	0	0	0	.	
No	120	100	120	100		NC
Total	120	100	120	100		
Pt. Discharge Status						
Alive	120	100	120	100		
Dead	0	0	0	0	.	NC
Total	120	100	120	100		

DISCUSSION

Table 1 analyze the data on the women's demographic variables revealed that nearly half of the women in the induced group were aged 16 years -23 years, while the majority of the women in the spontaneous group were aged 24 years - 31 years. These results are consistent with the study conducted in Italy by Poma who reported the majority of the participants in the induced group were within the age group of 16 years-23 years and 24 years -31 years in the spontaneous group [19].

Percentage distribution of the women's level of education revealed that the majority of the induced group were primary school graduates. This finding is inconsistent with the results of the previous study carried out in Nigeria by Lawani who reported that the majority of the induced group were tertiary graduates [20]. The present study showed that the majority of the women in the spontaneous group were illiterate. This finding is in line with that of the study conducted by Tarimo who reported similar results [21].

According to the data on the women's residency, a large proportion of the induced women lived in rural areas. This finding disagrees with those of a descriptive observational study which was conducted in Sulaymaniyah City, Iraq by Mohammed who reported that the majority of the induced group lived in urban areas [22]. It also disagrees with the results of a study carried out in Ethiopia which indicated that the majority of the induced group lived in urban areas [16]. However, a large proportion of the women in the spontaneous group lived in urban areas. This finding is in disagreement with those of the study conducted in Spain by Marco-Gracia who found that the highest proportion of women resided in rural areas [23].

Concerning the participants' occupations, the results of the current study indicated that the highest proportion of both study groups were housewives. This finding is persistent with those of an earlier study conducted by Yisma who demonstrated similar results [24]. Similarly, the results of another study conducted by Lueth showed that the highest proportion of both study groups were housewives [16].

According to the percentage distribution of the women's income, three-quarters of both groups were dissatisfied with their income. This finding is consistent with those of a study performed in Brazil by Velho who mentioned that most of the participants in both groups did not have a satisfactory income [25].

Measuring the participants' BMI showed that the highest proportion of the women in both groups was overweight. This finding is supported by those of the studies conducted by Hermesch, Addo, and O'Dwyer who reported that the highest percentage of the participants were overweight [26-28].

Percentage distribution of the women's smoking status showed that the majority proportion for the induced group were nonsmokers. This finding is in line with those of the study conducted in Sweden by Wennerholm who reported that the majority of the participants did not smoke. None of the spontaneous women in the present study smoked [29]. This finding is similar to those of a previous study conducted by Attanayake who reported similar results. However, this finding is not in line with those of the study conducted by Zanardo who reported that a small proportion of the spontaneous sample smoked [30, 31].

The results of the present study showed that there was a highly significant difference between the (Emergency C/S) and delivery method at p-value<0.001 (Table 2). A similar finding was reported in a study conducted by Jonsson who mentioned that the C/S rate in induced labor was over twofold greater than spontaneous labor (p<0.001). However, this finding is in contrast with those of a study carried out by Skeith who found that there was no significant difference between induction of labor and spontaneous labor in terms of the risk of C/S (p-value=0.052).

The results obtained from the data on post-partum blood loss revealed that there was a highly significant difference between post-partum blood loss and method of delivery at p- value<0.001. This finding is similar to those found in a previous study by Al-Turiahi who mentioned that compared to spontaneous labor, induction of labor was associated with a higher risk of post-partum blood loss (p<0.001). This finding is also supported by Khireddine who found that compared to spontaneous labor, induction of labor was associated with a higher risk of post-partum blood loss (p<0.01). The results of another study conducted by Al-Zirqi showed that there was a highly significant difference between post-partum blood loss and induction and spontaneous delivery at p- value<0.001. This finding is in contrast with those of a study conducted by Skeith who found that there was no significant difference between induction

of labor and spontaneous labor in terms of the risk of post-partum blood loss (p-value=0.083).

The results of the present study also revealed a highly significant difference between the delivery methods regarding perineal laceration (p-value<0.001). This finding is consistent with those of a previous study conducted by Thangarajah who reported that perineal laceration was significantly higher in the induction of the labor group (p=0.002). However, this finding disagrees with that of the study conducted in Bangladesh by Ferdous and Rahman who reported that there was no statistically significant difference between delivery methods regarding perineal laceration (p-value >0.05).

In the current study, it was found that there was a highly significant difference between the induced and spontaneous groups in terms of blood transfusion needed. This finding is in disagreement with those of a study conducted by Alalem who reported no significant differences between induced and spontaneous methods regarding blood transfusion needed (p-value=0.087).

It was also found that there was a highly significant difference between induced and spontaneous methods in terms of uterine atony (p-value<0.001). This finding is in contrast with those of the study conducted by Thangarajah who found that the two groups were not significantly different regarding their uterine atony.

The results of the present study showed a significant difference between the induced and spontaneous labor women in terms of their postpartum stay in the hospital. This finding is in agreement with the results of the study by Sujata who reported significantly different postpartum hospital stays at the hospital following induced and spontaneous labor (p- value=0.0001).

The results of the present study demonstrated that postpartum uterotonic use, ICU admission, admission causes, hysterectomy, and pt. discharge status was similar in both groups; therefore, they were not computed. This finding is not supported by Guerra who reported that compared to spontaneous labor, labor induction is associated with higher rates of some maternal complications, including the need for uterotonic drugs in the postpartum, hysterectomy, admission to an intensive care unit, and longer hospital stays [17]. According to ICU admission, which was not computed, this finding is supported by Gimovsky who mentioned similar findings.

CONCLUSION

In the present study, it was concluded that the majority of the induced group aged 16 years-23 years, graduated from primary school, lived in rural areas, were housewives, were not satisfied with their income, and were overweight, while the majority of the spontaneous group aged 24 years -31 years, were illiterate, lived in urban areas, were not satisfied with their income, and were overweight. The results showed that induction of labor is associated with an increased risk of cesarean delivery, postpartum blood loss, uterine atony, third-degree laceration, and prolonged postpartum hospital stay compared with spontaneous labor. In comparison with spontaneous labor, induced labor is associated with poorer maternal and neonate outcomes.producing *Streptomyces sp.* Secondary metabolites produced by these strains can be used to treat various bacterial and fungal diseases.

REFERENCES

1. Prosser, S.J., Barnett, A.G., and Miller, Y.D., Factors promoting or inhibiting normal birth. *BMC pregnancy and childbirth*, **2018**.18(1): p. 1-0.
2. Wing, D.A., and Sheibani, L., Pharmacotherapy options for labor induction. *Expert opinion on pharmacotherapy*, **2015**.16(11): p. 1657-1668.
3. Sciscione, A.C., Methods of cervical ripening and labor induction: mechanical. *Clinical obstetrics and gynecology*, **2014**. 57(2): p. 369-376.
4. Banos, N., et al., Definition of failed induction of labor and its predictive factors: two unsolved issues of an everyday clinical situation. *Fetal diagnosis and therapy*, **2015**.38(3): p. 161-169.
5. Landon, M.B., et al., Gabbe's Obstetrics Essentials: Normal & Problem Pregnancies E-Book. *Elsevier Health Sciences*, **2018**.
6. Suresh, S.C., et al., Evidence-based protocol decreases time to vaginal delivery in elective inductions. *American journal of obstetrics & gynecology MFM*, **2021**. 3(1): p. 100294.
7. Levine, L.D., et al., Mechanical and pharmacologic methods of labor induction: a randomized controlled trial. *Obstetrics and gynecology*, **2016**.128(6):p. 1357.
8. Mizrachi, Y., et al., Induction of labor in nulliparous women with unfavorable cervix: a comparison of Foley catheter and vaginal prostaglandin E_2. *Archives of gynecology and obstetrics*, 2016 .294: p. 725-730.
9. Penfield, C.A., and Wing, D.A., Labor induction techniques: which is the best?. *Obstetrics and Gynecology Clinics*, **2017**. 44(4): p. 567-582.
10. Saccone, G., and Berghella, V., Induction of labor at full term in uncomplicated singleton gestations: a systematic review and metaanalysis of randomized controlled trials. American journal of obstetrics and gynecology, **2015**.213(5): p. 629-636.
11. Knight, H.E., et al., Perinatal mortality associated with induction of labour versus expectant management in nulliparous women aged 35 years or over: An English national cohort study. *PLoS medicine*, **2017**. 14(11): p. e1002425.

12. Rydahl, E., Eriksen, L., and Juhl, M., Effects of induction of labor prior to post-term in low-risk pregnancies: a systematic review. *JBI database of systematic reviews and implementation reports*, **2019**. 17(2): p. 170.

13. Sinkey, R.G., et al., Elective induction of labor in the 39th week of gestation compared with expectant management of low-risk multiparous women. *Obstetrics & Gynecology*, **2019**. 134(2):282-287.

14. Kim, H.I., et al., Benefits and risks of induction of labor at 39 or more weeks in uncomplicated nulliparous women: a retrospective, observational study. *Obstetrics & gynecology science*, **2018**.62: p. e5.

15. Khandelwal, R., et al., Comparison of cervical length measured by Transvaginal Ultrasonography and Bishop Score in predicting response to labor induction. *The Journal of Obstetrics and Gynecology of India*, **2018**.68: p. 51-57.

16. Lueth, G.D., Kebede, A., and Medhanyie, A.A., Prevalence, outcomes and associated factors of labor induction among women delivered at public hospitals of MEKELLE town-(a hospital based cross sectional study). *BMC pregnancy and childbirth*, **2020**. 20(1): p. 1-0.

17. Guerra, G.V., et al., Factors and outcomes associated with the induction of labour in Latin America-BJOG: An International Journal of Obstetrics and Gynaecology, **2017**. 116(13): p. 1762-1772.

18. Abisowo, O.Y., et al., Feto-maternal outcome of induced versus spontaneous labour in a Nigerian Tertiary Maternity Unit. Tropical *Journal of Obstetrics and Gynaecology*, **2017**. 34(1): p. 21-27.

19. Poma, S., et al., Outcomes of induced versus spontaneous labor. *The Journal of Maternal-Fetal & Neonatal Medicine*, **2017**. 30(10): p. 1133-1138.

20. Lawani, O.L., et al., Obstetric outcome and significance of labour induction in a health resource poor setting. *Obstetrics and gynecology international*, **2014**.

21. Tarimo, C.S., Mahande, M.J., and Obure, J., Prevalence and risk factors for caesarean delivery following labor induction at a tertiary hospital in North Tanzania: a retrospective cohort study (2000–2015). *BMC pregnancy and childbirth*, **2020**.20: p. 1-8.

22. Mohammed AK. The relationship between some variables with birth outcome among postdate pregnant women delivering at Maternity Teaching Hospital Sulaymaniyah City, Iraq. Read and write, **2020**.26: p. 13.

23. Marco-Gracia, F.J., The influence of the lunar cycle on spontaneous deliveries in historical rural environments. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, **2019** .236: p. 22-25.

24. Yisma, E., et al., Elective labor induction vs expectant management of pregnant women at term and children's educational outcomes at 8 years of age. *Ultrasound in Obstetrics & Gynecology*, **2021**.58(1): p. 99-104.

25. Velho, M.B., et al., Prevalence of spontaneous, induced labour or planned caesarean section and factors associated with caesarean section in low-risk women in southern Brazil. *Midwifery*, **2019**.79: p. 102530.

26. Hermesch, A.C., Allshouse, A.A., and Heyborne, K.D., Body mass index and the spontaneous onset of parturition. *Obstetrics & Gynecology*, **2016**. 128(5): p. 1033-1038.

27. Addo, V.N., Body mass index, weight gain during pregnancy and obstetric outcomes. *Ghana medical journal*, **2010**.44(2).

28. O'Dwyer, V., et al., Maternal obesity and induction of labor. *Acta Obstetricia et Gynecologica Scandinavica*, **2013**.92(12): p. 1414-1418.

29. Wennerholm, U.B., et al., Induction of labour at 41 weeks versus expectant management and induction of labour at 42 weeks (SWEdish Post-term Induction Study, SWEPIS): multicentre, open label, randomised, superiority trial. *Bmj*, **2019**.367.

30. Attanayake, K., et al., Gestational age and birth weight centiles of singleton babies delivered normally following spontaneous labor, in Southern Sri Lanka. *Ceylon Medical Journal*, **2018**. .63(1): p. 17.

31. Zanardo, V., et al., The adaptive psychological changes of elective induction of labor in breastfeeding women. *Early human development*, **2017** .104: p. 13-16.