

## Indications of Labor Induction at Delivery Room of Maternity Teaching Hospital in Erbil city

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### ABSTRACT

**Background and objectives:** Induction of labour means stimulation of contractions before the birth starts spontaneously, with or without ruptured membranes. The most common indications include oligohydramnios, pre-labour rupture of the membranes, high blood pressure during pregnancy, severe fetal growth restriction, post-term pregnancy, and various maternal medical conditions such as chronic hypertension and diabetes. The aim of the study was to find out the different indications of labour and associated obstetrical factors in a local tertiary hospital.

**Methods:** A cross-sectional study was conducted among 120 parturient women who attended a delivery room in the Maternity Teaching Hospital in Erbil City from the period of 2nd June to 2nd October 2020. After reviewing the literature, a questionnaire was prepared to obtain socio-demographic data, data related to reproductive characteristic and data related to the indications for labour induction. The data were analyzed using descriptive and inferential statistical approaches.

**Results:** The study included 120 patients with the highest percentage of the patients (49.1%) were 16 to 23 years old and more than half of the sample (51.6%) had a post-term pregnancy, gestational hypertension and pre-eclampsia (15%). There were highly significant statistical differences between parity, gestational age and indication of labour induction, and significant differences between gravidity and antenatal care visits and indications for labour induction.

**Conclusions:** The majority of the sample had a post-term pregnancy of 40 and 42 weeks as an indication for induction of labour followed by gestational hypertension and pre-eclampsia, oligohydramnios and pre-labour rupture of membrane. There was a statistically significant difference between the antenatal care visit and parity with the induction of labour.

**Keywords:** Indication of labour induction; Post-term pregnancy; Oligohydramnios

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### INTRODUCTION

Induction of labour means stimulation of contractions before the birth starts spontaneously, with or without ruptured membranes. When the cervix is uneffaced and closed, labour induction often begins with the ripening of the cervix, a process that generally uses prostaglandins to open and soften the cervix[1]. The position and consistency of the cervix

are not necessary to predicting successful labour induction by oxytocin and amniotomy [2]. Induction is indicated when the benefits to the mother or fetus outweigh the benefits of continuing the pregnancy. The most common indications include oligohydramnios, pre-labour rupture of the membranes, high blood pressure during pregnancy, severe fetal growth restriction,

various maternal medical conditions such as chronic hypertension and diabetes [3] . and post-term pregnancy, particularly between 40 and 42 weeks [4]. There are potential medical advantages of scheduled induction of full-term delivery, such as reduced stillbirth and further fetal growth, leading to macrosomia and its consequences. According to some studies, the risk of Cesarean section (CS) is lower among women whose labour was induced than among those expectantly managed in term and post-term pregnancies with the benefits to the fetus and no increased risk of maternal death [5]. Induction of labour, regardless of the method used, is associated with a higher risk of postpartum haemorrhage [6], failed induction of labour [7], increased risk of CS [8], uterine hyperstimulation [9], increased risk of cord prolapse [10] and increased risk of uterine rupture [11]. Labour induction is the most common interventional procedure in obstetrics. It is applied in 20% to 25% of all pregnancies [12]. The indication of labour induction affects the risk of CS. Specifically, the induction of labour for fetal indications greatly increases its risk in nulliparous women [13]. Induction of labour for gestational diabetes mellitus, post-term, hypertensive disorders in pregnancy and macrosomia is associated with a higher risk for CS, while induction of labour for intrauterine growth restriction and previous fast labour carries a lower risk for CS [14]. According to the reports of patients who were hospitalized in the Maternity Teaching Hospital in Erbil City, the number of women inducing labour is increasing daily. This is a problematic and risky process that has a negative impact on the health of the mother and the infant. This study aimed to find out the different indications for labour induction and associated socio-demographic and obstetrical factors.

## METHODS

A quantitative, cross-sectional descriptive study was conducted on 120 parturient women in the Maternity Teaching Hospital in Erbil City (MTH) from the period of 2nd June to 2nd October 2020. The sample size was determined by using the following formula [15]:

$$n = N / (1 + Ne^2)$$

$$n = 140 / (1 + 140(0.05)^2)$$

$$n = 103$$

n = the sample size

N = the size of the population (based on MTH report of admissions of the parturient women for the induction of labour every month (35 cases), so the estimated population for four months was 140 patients)

e = the alpha- error of 0.05

Accordingly, the estimated sample size was 103 women but the study included 120 patients. The researcher obtained the permission of the Ethics Committee at the College of Nursing. (Number 92), Hawler Medical University in Erbil and the official approval from the Erbil General Directorate of Health. A non-probability purposive sampling method of parturient women was done and the data were gathered through a direct interview and observation by using the questionnaire. The questionnaire was prepared for collecting data after reviewing the literature. The pilot study was conducted on 15 patients who were selected purposively from the MTH from 20 April to 31 May 2020. The pilot study was useful to determine the reliability, clarity, acceptability of the tool. The results were checked to determine reliability by calculating Cronbach's alpha (0.81). Socio-demographic data of patients included age, educational level, residency, occupation, socio-economic state, smoking, passive smoking, and the Body Mass Index before pregnancy and after pregnancy (< 18.5 underweight, 18.5-25 normal weight, 25-

29.9 overweight, 30-35 obesity, and > 35 morbid obesity). Data related to reproductive characteristic included the history of infertility, antenatal care visits, parity (0 - nulliparous, 1-primiparous, 2-4 – multiparous, and ≥ 5 - grand multipara), gravidity (1- primigravida, 2-4 -multigravida, and ≥ 5 - grand multigravida) and gestational age. The data related to the indication of labour induction included post-term pregnancy, decreased fetal movement, pre-labour rupture of membranes, gestational hypertension plus pre-eclampsia, gestational diabetes, oligohydramnios, vaginal bleeding, and chorioamnionitis. Data were analyzed using the Statistical Package for Social Sciences (SPSS, version 21), by using descriptive (frequency and percentage) and inferential (One-Way ANOVA test) statistical approaches.

**RESULTS**

Table 1 shows the socio-demographic characteristics of the study sample. the highest percentage of the women (49.1%) were within the age range of 16 to 23 years of age. Regarding the educational level and the place of living, 26.6% were primary school graduates and 45% lived in a rural area. In terms of occupation, 97.5% were housewives, and about three quarters (76.7%) were not satisfied with their socio-economic status. The Body Mass Index (BMI) data measured before pregnancy showed that 36.7% of women had normal weight, but this percentage decreased to 11.7% after pregnancy. Assessment of the smoking status indicated that the majority (96.7%) were non-smokers, but about half (50.8%) of the participants were exposed to secondary smoking. Table 2 shows the distribution of the reproductive data of the study sample, in which more than three-quarters of the sample (78.3%) had no history of infertility. 78.3% had the years of

infertility zero (no years of infertility) and 91.7% of women attended the antenatal care visits (59.2% of women attended 1-5 visits). Based on the parity, para 1-4 represented the highest proportion (52.5%), and 81.7% of the sample were the gravida 1-4. 53.3% of cases were at a gestational age of 41-42 weeks.

**Table 1:** Distribution of the Demographic Data of the Study Sample (No.: 120).

The Characteristics	Subgroups	Induced labor	
		f.	%
<b>Age Groups (Years)</b>	16 – 23	59	(49.1)
	24 – 31	33	(27.5)
	32 – 39	26	(21.7)
	40 Years and more	2	(1.7)
	Mean ± S.D.	1.76 ± 0.850	
<b>Education Level</b>	Illiterate	28	(23.3)
	Able to Read and Write	17	(14.2)
	Primary School	32	(26.6)
	Secondary School	26	(21.7)
	College or Institute	17	(14.2)
<b>Residence</b>	Urban	35	(29.2)
	Suburban	31	(25.8)
	Rural	54	(45)
<b>Occupation</b>	Government Employee	1	(0.8)
	Student	2	(1.7)
	House wife	117	(97.5)
	Satisfy	28	(23.3)
<b>Socio-economic Status</b>	None Satisfy	92	(76.7)
	Under Weight	1	(0.8)
<b>BMI Before Pregnancy</b>	Normal Weight	44	(36.7)
	Over Weight	45	(37.5)
	Obesity	27	(22.5)
	Morbid Obesity	3	(2.5)
	Under Weight	0	(0)
<b>BMI After Pregnancy</b>	Normal Weight	14	(11.7)
	Over Weight	41	(34.2)
	Obesity	40	(33.3)
	Morbid Obesity	25	(20.8)
	Yes	4	(3.3)
<b>Smoking</b>	No	116	(96.7)
	Yes	59	(49.2)
<b>Secondary Smoking</b>	Yes	59	(49.2)
	No	61	(50.8)

Grand Mean: 2.59, BMI: Body Mass Index, f.: frequency, No.: Number, %: percentage.

**Table 2:** Distribution of the Reproductive Data of the Study Sample (No.: 120).

The Characteristics	Subgroups	Induced labor	
		f.	%
History of Infertility	Yes	26	(21.7)
	No	94	(78.3)
Years of Infertility	0	94	(78.3)
	1-3 Years	23	(19.2)
	4-6 Years	3	(2.5)
Antenatal Care Visit (Follow-up)	Yes	110	(91.7)
	No	10	(8.3)
No. of Visits	0	10	(8.3)
	1-5 Visits	71	(59.2)
	6-10Visits	39	(32.5)
Number of Para	0	51	(42.5)
	1	25	(20.8)
	2-4	38	(31.8)
	5 and more	6	(4.9)
Number of Gravida	1	47	(39.2)
	2-4	51	(42.6)
	5 and more	22	(18.2)
Gestational Age	37-38weeks	31	(25.8)
	39-40weeks	25	(20.8)
	41-42weeks	64	(53.3)

BMI: Body Mass Index, f.: frequency, No.: Number, %: percentage.

Table 3 shows the distribution of the indications for induction of labour data, which shows that 51.6% of the sample had post-term pregnancy followed by gestational hypertension + pre-eclampsia (15%) and oligohydramnios (13.4%).

**Table3:** Distribution of the Indications of labor Induction of the Study Sample (No.: 120).

Indications of Induction	F	%
Postdate Pregnancy	62	(51.6)
Decrease Fetal Movement	3	(2.6)
Pre-labor Rupture of Membrane	10	(8.4)
Gestational Hypertension + Preeclampsia	18	(15)
Gestational Diabetes	7	(5.3)
Oligohydramnios	16	(13.4)
Vaginal Bleeding	4	(3.4)
<b>Total</b>	<b>120</b>	<b>(100)</b>

f.: frequency, %: percentage.

Table 4 shows the difference between the reproductive characteristics and the indications for labour induction. There were non-significant differences between the history of infertility at p-value = 0.956, years of infertility at p-value = 0.938, and the number of antenatal care visits at p-value = 0.254 and the indication for labour induction. There were significant differences between antenatal care visits at p-value = 0.038 and gravidity at p-value = 0.01 and an indication of labour induction. There were highly significant statistical differences between parity at p-value < 0.001, gestational age at p-value < 0.001 and an indication for labour induction.

**Table4:** difference between Reproductive Characteristics and Indications of Induction by One-Way ANOVA test (n=120).

Reproductive Characteristics	Indications of Induction	Mean	S. D.	F. value	p-value
<b>History of Infertility</b>	Postdate Pregnancy	1.79	0.410	0.257	0.956
	Decrease Fetal Movement	2.00	0.000		
	Pre-labor Rupture of Membrane	1.80	0.422		
	Gestational Hypertension + Preeclampsia	1.72	0.461		
	Gestational Diabetes	1.86	0.378		
	Oligohydramnios	1.75	0.447		
	Vaginal Bleeding	1.75	0.500		
<b>Years of Infertility</b>	Postdate Pregnancy	1.03	0.178	0.295	0.938
	Decrease Fetal Movement	1.00	0.000		
	Pre-labor Rupture of Membrane	1.00	0.422		
	Gestational Hypertension + Preeclampsia	1.06	0.236		
	Gestational Diabetes	1.00	0.000		
	Oligohydramnios	1.00	0.000		
	Vaginal Bleeding	1.00	0.000		
<b>Antenatal Care Visits</b>	Postdate Pregnancy	1.05	0.216	2.322	0.038
	Decrease Fetal Movement	1.33	0.577		
	Pre-labor Rupture of Membrane	1.10	0.316		
	Gestational Hypertension + Preeclampsia	1.06	0.236		
	Gestational Diabetes	1.14	0.378		
	Oligohydramnios	1.06	0.250		
	Vaginal Bleeding	1.50	0.577		
<b>No. of Visits</b>	Postdate Pregnancy	1.53	0.646	1.320	0.254
	Decrease Fetal Movement	1.67	1.155		
	Pre-labor Rupture of Membrane	1.70	0.675		
	Gestational Hypertension + Preeclampsia	2.00	0.840		
	Gestational Diabetes	1.71	0.756		
	Oligohydramnios	1.56	0.629		
	Vaginal Bleeding	1.25	0.500		
<b>Para</b>	Postdate Pregnancy	1.11	0.319	4.699	< 0.001 ***
	Decrease Fetal Movement	2.00	0.000		
	Pre-labor Rupture of Membrane	1.00	0.000		
	Gestational Hypertension + Preeclampsia	1.17	0.383		
	Gestational Diabetes	1.14	0.378		
	Oligohydramnios	1.06	0.250		
	Vaginal Bleeding	1.00	0.000		
<b>Gravida</b>	Postdate Pregnancy	1.18	0.385	3.545	0.01 **
	Decrease Fetal Movement	2.33	0.577		
	Pre-labor Rupture of Membrane	1.10	0.316		
	Gestational Hypertension + Preeclampsia	1.22	0.428		
	Gestational Diabetes	1.29	0.756		
	Oligohydramnios	1.13	0.342		
	Vaginal Bleeding	1.00	0.000		
<b>Gestational age</b>	Postdate Pregnancy	2.98	0.127	78.783	< 0.001 ***
	Decrease Fetal Movement	1.33	0.577		
	Pre-labor Rupture of Membrane	1.80	0.789		
	Gestational Hypertension + Preeclampsia	1.44	0.616		
	Gestational Diabetes	1.43	0.535		
	Oligohydramnios	1.44	0.512		
	Vaginal Bleeding	1.75	0.500		

Grand Mean: 2.98, d.f.: 239, ANOVA: analysis of variance, f.: frequency, F. value: Fisher test, \*\*\*: high significant, No.: Number, S.D.: Standard deviation, ≤: less than and equal to, %: percentage, +: plus.

## DISCUSSION

In the current study about half of the sample (49.1%) between 16–23 years old, which agrees with the results of a previous study done in Oromia [16]. However, it is in disagreement with the results of the previous study, which was done in Eastern Nepal. [17]. Most of the women in the current study were primary school graduates, which is similar to the result of the previous study done by Lawani et al. [18]. Concerning the occupation, housewives represented the largest group, which contrasts with the study conducted in Brazil [19]. Before the pregnancy, the majority of this study participants were overweight, which disagrees with the study done by Dundar et al. [20]. The present study's findings showed that the highest percentage of patients were overweight at term and are supported by other studies [20]. But they contradict the study conducted in Saudi Arabia [21]. Based on the parity, the result of the present study showed that 1-4 para represented the highest proportion, which is similar to the results of the previous study [22]. In terms of gravidity, the 1-4 gravida group of the study sample made up more than a third of the sample, which agrees with the previous study [22]. Regarding the gestational age, the result of the present study showed that the 41-42 weeks gestational age was present in the highest percentage of cases, which disagrees with the result of the study done in Sweden [23]. The most common indication for the induction of labour was the post-term pregnancy, which is similar to the previous study conducted in Tanzania [24], but different from the report by Lueth et al., which identified the pre-labour rupture of membranes as the most common indication, followed by the post-term pregnancy [25]. The second most common indication in this study was gestational hypertension

+ pre-eclampsia followed by oligohydramnios and the pre-labour rupture of the membranes. There was a statistically significant difference between the antenatal clinic follow-up and the induction of labour, which agrees with earlier studies that demonstrated similar results [16]. The data also showed a highly significant difference between parity and all indications for labour induction. This finding is similar to a study conducted in Turkey [26]. Furthermore, the results indicated that there was a statistically significant difference between gravidity and the indications for labour induction similarly to the reported study done in Ethiopia [25]. The present study revealed that gestational age was one of the factors that yielded a highly significant difference with the indication of labour induction. A previous study also indicated that gestational age makes a significant difference in labour induction [27].

## CONCLUSION AND RECOMMENDATIONS

This study shows that the highest proportion of the sample had post-term pregnancy as an indication for the induction of labour followed by gestational hypertension + pre-eclampsia, oligohydramnios and pre-labour rupture of the membranes. There was a statistically significant difference between antenatal care visits and gravidity with the induction of labour. The researcher recommends doing further research on a larger sample size. Further research is needed to determine the risk factors for indications of labour induction.

## CONFLICTS OF INTEREST

This work has no potential conflicts of interest, whether of financial or other nature.

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