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Potential dangers of factors associated with preterm delivery in Wasit governorate

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Abstract

Objective: Preterm births include those born between 24 and 36 plus 6 weeks of pregnancy.

The goal of the current study is to identify many important risk factors for preterm delivery. A 50 women who gave birth to full-term babies equal to or greater than 37 completed weeks of gestation were compared with 62 women who gave birth to preterm babies between 24 weeks and less than 36+6 weeks of gestation in a cross-sectional descriptive case control study. Additionally, the questionnaire was created using the most likely risk variables stated for pregnant women.

Methods and Material: The data was collected from 5th February 2020 to 30th October 2020 from 112 patients in Wasit from Al Kut hospital and Al-Haj Jalal hospital. It was a case control study from patients with preterm and term labour and included 62 women who gave birth to preterm babies delivered between 24 weeks and less than 36+6 weeks of pregnancy were compared with 50 women who gave birth to full.

Results: The main findings derived from our study include the following major risk factors that are associated with pre-term birth: Previous preterm labour 94.7%, Previous Multiple pregnancy 90.5%, Rupture of membrane 90.0%, Ante-partum hemorrhage 88.2%, Cervical incompetence 83.3%, Caesarean section 76.2%, Urinary tract infection (treated 70.8% non-treated (76.9%), emotional disturbance (anxiety 70.6% depression 70.0%).

Conclusion: Risk factors can actually be avoided through maternal education and availing to them early information through prenatal checkups then the incidence and consequences of there is risk factors are minimized.

Keywords: Preterm delivery, risk factors, preterm birth, gestation

Introduction

Preterm births include those born between 24 and 36 plus 6 weeks of pregnancy. Preterm birth can be divided into three groups according to the gestational age at delivery: extremely low, moderate/late (32 to <37), and very low (28 to <32) born babies [1]. Birth weight is another way to identify preterm birth: Low birth weight (less than 2500g), very little birth weight (less than 1500g), and extremely small birth weights (less than 1000g) are typical categories [2].

Delivery before 37 weeks of pregnancy that is marked by spontaneous labor or after PROM is known as spontaneous PTB, while delivery after antepartum inducement of labor or elective cesarean birth because of problems for the mother or fetus or for reasons that are not medical is known as indicated PTB [3]. About 40% to 45% are primary spontaneous, while the remaining 30% to 35% are iatrogenic or suggested because of medical or obstetrical grounds. Preterm premature breaking of membranes (PPROM) accounts for 25% to 30% [4]. Preterm birth remains a challenge to global health care; ¼ of neonatal deaths occur among preterm babies.

A variety of morbidities are much higher in preterm neonates who survive as compared to the full-term neonates. Premature neonates are much more prone to multiple organ pathology, including respiratory tract involvement, cardiovascular CV, GIT, metabolism, neurological and urinary systems, compared with term neonates [5]. Threatened preterm labour TPL has been defined as the presence of at least 3 regular and painful uterine contractions within a 30-minute period cervical dilation of 1cm, cervix less than 80% effaced and having a cervical length of less than 2.5 cm by endocervical (transvaginal) ultrasound examination [6].

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Risk factors**Obstetrical and Gynecological Factor**

Inter-pregnancy interval (IPI), also known as birth to pregnancy interval, is defined as the time elapsed from a live birth to subsequent conception or a woman's last menstrual period (LMP) [1]. The World Health Organization (WHO) recommended at least 24 months between a live birth and subsequent conception, and IPI less than 24 months is generally considered short [7].

The most important risk factor for preterm delivery in a future pregnancy is obstetrical history (FHx). Variables related to the uterus (uterine curettage, Cervical variables (cervical procedures like conization, Short cervical length [8].

Preterm labor and delivery is more likely to occur if the cervical length is under twenty-five mm in the early or late second trimester. When assessed at 28 weeks, a cervical length of twenty-five millimeters or less exhibited a 49% sensitivity for preterm births before 35 weeks (study data) [9].

Uterine fibroids, particularly those in the submucosal and subplacental regions, and other abnormalities in the structure of the uterus, such as a bicornate or unicorn uterus, are linked to preterm labor. Women who are diagnosed with uterine malformations during preconception management may be advised to have contraception, or surgery if possible. Trauma or diethylstilbestrol having caused cervical incompetence can cause cervical effacement and dilation, painless and preterm labor. Either of these circumstances may be improved by the positioning of a cerclage [9,10].

Demographical Factors

In addition to socioeconomic determinants, race and ethnicity are direct predictors of spontaneous preterm birth. Extremes in body mass index are predictive with spontaneous preterm birth, even when other considerations are taken into account. Smoking (smoking during the first trimester increases the risk of premature birth by 20% and increases the chance of preterm delivery by substantially). Practices include: Maternal stressors, Education and poverty and other social practices. Through a survey with 150 samples of pregnant mothers, pregnant mothers who perform heavy physical work are at 25% more likely to develop preterm labor than mothers who perform light work [11].

Complications related to current gestation

When there are placental complications, such as placenta previa or abruption, that increase the chance of preterm prelabor rupture of the membrane, uterine bleeding in the second and third trimesters is a risk factor. First, the risk of preterm prelabor rupture of membranes is doubled in the first trimester and 10 times greater in the second and third trimesters. fetal malformation (this risk may be increased by polyhydramnios), Multiple gestations (the rates of mild preterm birth, late preterm birth, and term delivery were 14.5%, 49.8%, and 35.5%, respectively, for all twins) For dichorionic twins, the premature birth rate before 32 weeks was 5%, whereas for monochorionic twins it was 10%. Systemic infections in mothers and bacterial vaginosis Intra-amniotic inflammation or subclinical infection, Microbial imbalance of the vagina and preterm delivery.

Note: most women who experience a spontaneous PTD have no antecedent risk factors; [12].

Prediction of preterm delivery

Preterm labour and birth are a major cause of perinatal morbidity and mortality. Despite modern advances in obstetric and neonatal management, the rate of preterm birth in the developed world is increasing. Yet even though numerous risk factors associated with preterm birth have been identified, the ability to accurately predict when labour will occur remains elusive, whether it is at a term or preterm gestation. Because newborn mortality is not significantly impacted by the way PTL is currently managed, emphasis has been made on identifying which of such women have signs that indicate high risk for PTL so as to prevent the occurrence. Risk score chart is very much dependent on past obstetric history and is thus valuable in first-time mothers [13].

- 1. Past obstetric history:** If a woman has had a previous PTD it is 4 times more likely that she will experience PTL in her subsequent pregnancy than a woman who has delivered at term previously.
- 2. Cervical length by ultrasound:** It has been established that transvaginal ultrasonographic cervical length can predict preterm delivery in women with TPL as well as asymptomatic low- and high-risk individuals (including those with a history of sPTB) [14].

It has been shown that transvaginal cervical length is more accurate than digital cervical assessment or transabdominal cervical length. About 80.6% of very early spontaneous PTD may be distinguished from CLE at a screen-positive rate of 10% using cervical length and obstetric history [13].

Prevention of preterm labour

Therefore, in order to assist prevent premature birth, pregnant women should have access to perinatal care. Avoiding sexual activity, & bed rest should be recommended for the high-risk patient. The incidence of premature birth may be decreased in certain individuals by treating women with bacterial vaginosis with antibiotics and elective cervical cerclage. Take care of any health problems, like diabetes, high blood pressure, or depression. Don't smoke, drink, or use illegal drugs. Eat a diet that includes a variety of healthy foods, protect yourself from infections (wash your hands well and often; don't eat raw meat, fish, or unpasteurized cheese; use condoms when having sex; don't change cat litter, Reduce stress in your life. [15].

Management of preterm labour

About half of women with threatening PTL who are admitted to the labor ward will not give birth until term, and between 30 and 70 percent will not give birth during that stay. Fetal fibronectin (FFN), a glycoprotein derived from cervicovaginal secretions and amniotic fluid, placenta tissue, and the attachment zone between chorion and decidua, has been measured in cervicovaginal fluid to help identify who is and is not a part of PTL.

Management goals crown their earlier first components with the intent to avert neonatal complicate use of corticosteroids in anticipation of birth and antibiotics to avert group B streptococcal neonatal sepsis and where feasible avoid traumatic delivery. Delivery in a medical center with an experienced resuscitation team and the NICU's presence will guarantee the life of neonatal outcomes [16]. To help newborn lung maturity, tocolytics are used to extend the

time required for corticosteroids. If at all possible, a drug that blocks calcium channels (nifedipine) or (oxytocin receptor) antagonists (atosiban) should be utilized. PTD is less likely to result in substantial benefits than PG inhibitors and beta-agonists, according to a recent meta-analysis and systematic review of tocolytic agents: Ritodrine, salbutamol, and terbutaline are selective β_2 adreno-receptors that relax the myometrium by raising cyclic adenylyl monophosphate (AMP). The study found that they slow the delivery process providing no benefit to the neonate or the ultimate rates of PTD [13].

It's still unknown how magnesium sulfate functions as a tocolytic drug. This drug lowers the rate of smooth muscle depolarization via modifying calcium uptake, binding, and distribution in smooth muscle cells. In the end, the uterine contractions are suppressed [17].

Non-steroidal anti-inflammatory drugs: indomethacin was the first NSAID used to treat PTL; it has been shown to stop delivery for 48 hours, 7-10 days, and after 37 weeks, reducing the incidence of LBW (<2,500 g). But even while PG inhibitors can help prevent PTD, it has long been known that calcium channel blockers can lessen myometrial contractions in humans. Antagonists of the oxytocin receptor play a role in both the start and progression of labor activity. When atosiban is administered, oxytocin-induced PG release and dose-related reduction of uterine contractility occur. It is equally effective as beta sympathomimetics.

Progesterone therapy

Antenatal progesterone medication is the most effective method of preventing further preterm deliveries in women who have had a single gestation pregnancy that was previously delivered spontaneously. These women benefit from this progesterone starting at 16-24 weeks of pregnancy and continuing until 34 weeks. Cervical PGE2 levels have been shown to be appropriate for vaginal progesterone in individuals without a history of SPTB if they measure 20 mm or less prior to week 24 of pregnancy [18].

Major risks of early preterm delivery

1. Death
2. Respiratory distress syndrome
3. Hypothermia
4. Hypoglycemia
5. Necrotizing enterocolitis
6. Jaundice
7. Infection
8. Retinopathy of prematurity [19].

The aims of this study:

This study has aimed at the determination of the antecedent & risk factors for preterm labour. Knowing the most frequent risk factor underlying the examined preterm deliveries in Wasit Governorate.

Methods and Materials

The data was collected from 5th February 2020 to 30th October 2020 from 112 patients in Wasit from Al Kut hospital and Al-Haj Jalal hospital. It was a case control study from patients with preterm and term labour and included 62 women who gave birth to preterm babies delivered between 24 weeks and less than 36+6 weeks of pregnancy were compared with 50 women who gave birth to full. We

excluded women under 22 weeks of the gestation, severe congenital anomalies, intrauterine fetal death antenatal, education level, occupation, parity, prior preterm birth, prior abortion or not, gestational interval, if the infant(s) was twin, mode of delivery, numbers of ANC visits, vaginal discharge (treated/not treated), antepartum hemorrhage, urinary tract infection (treated/treatment not), hypertension or diabetes complications, preeclampsia, significant fights, depression, worries, cervical cerclage the data were sorted into software by mean of IBM SPSS statistics version 25. Frequency distribution tables were then constructed and the association of the risk factors under study was determined by using the chi-square test at a level of significance $p < 0.05$.

Results

The study cases composed of 112 patients divided into two groups: Observational group being patients who delivered a term baby ($n=50$), and interventional group, comprising of patients with preterm labor ($n=62$). Majority of the respondents in cases were in between 20-34 (80.4%), and college education almost three quarters (70.5%) only 12.5% were primary education, (67.0%) were housewife while the employee were (33.0%)

Table 1: Socio-demographic characteristics of the respondents.

Variable		Number	Percent
Maternal Age	<20 years	13	11.6
	20-34 years	90	80.4
	>34 years	9	8.0
Educational Level	Primary Education	14	12.5
	Secondary Education	19	17.0
	College	79	70.5
Occupation	Employee	37	33.0
	Housewife	75	67.0

Table 2: It reveals various socio demographic characteristics and obstetric risk factors that determine birth outcome in Saudi generating countries, in this study we compared women with recent preterm delivery and women with term delivery.

The previous surveys have revealed that in 18 out of 62 women with preterm delivery rates a previous hx of premature pregnancies, while the same for the family hx of the preterm labour was also 18 out of 62; in others, 1 out of 50 has a previous hx of preterm deliveries and the same for family hx of preterm labour. Our p value here is less than 0.001 which proves that previous hx.

Self-employed women in interviewing 19 of 62 women with preterm deliveries had a current multiple pregnancy. Other woman 2 of 50 had a current multiple pregnancy also from the test conducted our p value is less than 0.001 which indicates that multiple pregnancy is highly significant in increasing the chances of a premature birth. Here we finding that 30 out of 62 women with preterm delivery had Antepartum hemorrhage while for other 50 women Antepartum hemorrhage was found in only 4 women, our p value here is less than 0.001, Thus, Antepartum hemorrhage also predicted the premature pregnancy significantly. Within 27 out of 62 women with preterm deliveries, 3 out of 50 women with other pregnancies experienced PROM and our p value here, less than 0.001, indicates significant difference with the PROM in argue premature pregnancy prediction.

When analyzing our data, only 2 out of 50 women who had a premature pregnancy were diagnosed with Cervical incompetence, while in surveying 10 out of the 62 women, Cervical incompetence was detected in our study population, significant at $p = 0.039$ indicating the importance of Cervical incompetence as a major predictor of premature pregnancy. In surveying 32 out of 62 of women

with preterm deliveries had previous Caesarean section while for others 10 out of 50 had previous CS, Our p value here is less than 0.001 which again tells that significant factor affecting premature pregnancy is Caesarean section done earlier. Abortion is not even statistically considered a risk factor in our analysis, but the numbers were significantly different between preterm and term labour.

Table 2: Association between socio-demographic characteristics and obstetric factors with birth outcome.

Variable		Number		X ²	p-value
		Preterm	term		
Maternal Age	<20 years	10(76.9%)	3(23.1%)	3.569	0.168
	20-34 years	46(51.1%)	44(48.9%)		
	>34 years	6(66.7%)	3(33.3%)		
Educational Level	Primary Education	8(57.1%)	6(42.9%)	0.591	0.744
	Secondary Education	9(47.4%)	10(52.6%)		
	College	45(57.0%)	34(43.0%)		
Occupation	Employee	20(54.1%)	17(45.9%)	0.038	0.846
	Housewife	42(56.0%)	33(44.0%)		
Previous Pre-term Birth	Yes	18(94.7%)	1(5.3%)	14.358	< 0.001
	No	44(47.3%)	49(52.7%)		
Previous cs	Yes	32(76.2%)	10(23.8%)	18.738	< 0.001
	No	30(42.9%)	40(57.1%)		
Previous Abortion	Yes	15(75%)	5(25%)	3.801	.051
	No	47(51.1%)	45(48.9%)		
Interval between pregnancies	<1	10(55.6%)	8(44.4%)	5.220	0.074
	>1	25(45.5%)	30(54.5%)		
	1 st born	27(69.2%)	12(30.8%)		
Multiple Pregnancies	Yes	19(90.5%)	2(9.5%)	12.899	< 0.001
	No	43(47.3%)	48(52.7%)		
Cervical Cerclage	Yes	10(83.3%)	2(16.7%)	4.256	0.039
	No	52(52.0%)	48(48.0%)		
Vaginal Bleeding	Yes	30(88.2%)	4(11.8%)	21.355	< 0.001
	No	32(41.0%)	46(59.0%)		
Uterine Anomaly	Yes	3(100.0%)	0(0.0%)	2.486	0.115
	No	59(54.1%)	50(45.9%)		
Premature rupture of membrane	Yes	27(90.0%)	3(10.0%)	19.899	< 0.001
	No	35(42.7%)	47(57.3%)		
Family History of PTL	Yes	18(94.7%)	1(5.3%)	14.358	< 0.001
	No	44(47.3%)	49(52.7%)		

Table 3: it shows the Association between medical conditions with birth outcomes. Almost three quarters of preterm women have urinary tract infection (34 out of 62 with preterm labour have UTI but treated, 10 of them doesn't treated.

For term women 14 out of 50 was treated and 3 wasn't treated so the p value is less than 0.001. which shows the significance of urinary tract infection as a major factor in predicting a premature pregnancy.

Table 3: Association between medical conditions with birth outcomes.

Variable		Number		X ²	p-value
		Preterm	Term		
Vaginal Discharge	Yes, untreated	8(61.5%)	5(38.5%)	3.591	0.166
	Yes, treated	24(66.7%)	12(33.3%)		
	No	30(47.6%)	33(52.4%)		
UTI	Yes, untreated	10(76.9%)	3(23.1%)	15.405	< 0.001
	Yes, treated	34(70.8%)	14(29.2%)		
	No	18(35.3%)	33(64.7%)		
DM	Yes	8(72.7%)	3(27.3%)	1.489	0.222
	No	54(53.5%)	47(46.5%)		
Hypertension	Yes	6(60.0%)	4(40.0%)	0.096	0.757
	No	56(54.9%)	46(45.1%)		
Preeclampsia	Yes	13(72.2%)	5(27.8%)	2.468	0.116
	No	49(52.1%)	45(47.9%)		

*values in orange are significant at level of 0.05

Table 4 it demonstrates the Relationship between the lifestyle and birth outcome. In fact out of 62 of women with

preterm deliveries, 24 had anxiety while for others 10 out of 50 had anxiety, 14 out of 62 of PTL women had depression,

while for others 6 out of 50 had it and 9 out of 62 of PTL women experienced a severe fight while for others 14 out of

50 had such a feelings Our p value here is 0.022.

Table 4: Association between lifestyle and birth outcome.

Variable		Number		X ²	p-value
		Preterm	Term		
antenatal care	4 or more visits	50(59.5%)	34(40.5%)	2.360	0.124
	0-3 visits	12(42.9%)	16(57.1%)		
Obesity	Yes	9(60.0%)	6(40.0%)	0.151	0.698
	No	53(54.6%)	44(45.4%)		
Emotional Disturbances	None	15(42.9%)	20(57.1%)	9.590	0.022
	Severe fight	9(39.1%)	14(60.9%)		
	Anxiety	24(70.6%)	10(29.4%)		
	Depression	14(70.0%)	6(30.0%)		

*values in orange are significant at level of 0.0

Table 5: We found that 39 out of 62 with preterm baby was delivered by Caesarean section while only 11 out of 50 with term baby was delivered by CS

Variable	Route of delivery	Number	
		Preterm	Term
Type of delivery	Normal	23(37.1%)	39(62.9%)
	CS	39(78.0%)	11(22.0%)

Discussion

This study established that UTI has a positive correlation with preterm labour; 44 of the 62 preterm subjects had UTI (10 of whom had untreated infection and 34 who received treatment for it) nevertheless, UTI remained recurrent in many of them as pregnancy progressed. A significant association have been noted in Offiah and also Mahapula *et al.* [2, 3].

they both discovered that of the patient who are preterm most will develop urinary tract infection. Therefore, Maternal UTI is statistically significant for preterm delivery and CS Delivery when tested for independently.

PTL is directly impacted by UTIs since they can cause amnionitis. Second, the bacterially produced enzyme collagenase may cause the fetal membranes to soften. It was suggested that bacterial compounds, such as endotoxins or phospholipase A and C, may cause the fetal membranes to produce prostaglandins, which would trigger labor. Out of 62 preterm patients, 19 have delivered twins in these current pregnancy so multiple pregnancy is directly linked to preterm labour; same has been concluded by Mahapula and Stock *et al.* [3, 21]. Premature labour and multiple pregnancy have been found to be partners; Murray *et al.* stated that 50% of twins deliver before 37 completed weeks of pregnancy, and 10% before 32 weeks.

Out of 62 preterm women, 18 had previous preterm labor so the relationship between previous PT and PTL was significant as in Mahapula and El Beltagy *et al.* [3, 4] and Ansu *et al.* found PT women who had a history of spontaneous PTB (37wk of gestation) were 2.5 fold more likely to have PTB in subsequent pregnancy than women without history of PTB [23].

The results regarding family history of preterm labour provided very strong evidence of the correlation between preterm labour and family history of PTL (18 of preterm women was having family history of PTL).

Koire *et al.* also reported maternal PTB in index pregnancy depended on family history of PTB among female members including sisters in two previous generations. It was present in gravidae without a history of PTB [24].

Premature births include those that occur before 37 weeks of pregnancy (46%), before 34 weeks of pregnancy (30%), before 28 weeks of pregnancy (23%), and before 24 weeks of pregnancy (17%) [25].

In this study, it for the Antepartum hemorrhage was identified that half of the patients with preterm labour (30 among the 62 of patients) had Antepartum hemorrhage [26].

Challenge: El Beltagy *et al.* found it's a risk factor [4] as similar to our study and Sharami *et al.* Findings described that vaginal bleeding increased the risk of preterm delivery by three folds. The present study revealed that 32 of 62 patients with preterm labour had a history of previous operation (mainly CS), so the previous CS predisposes women to preterm labour, consistent with El Beltagy *et al.* [4] Regarding Cervical incompetence this study shows that in patients with preterm labour it was (10 of 62 of them) but for women with Cervical incompetence the risk to have preterm labour is 15% higher, Mahapula and El Beltagy *et al.* found the similar thing in their study identifying cervical incompetence as a significant risk factor [3, 4].

The relation between preterm labour and the emotional disturbance which pregnant with experience in pregnancy are very strong have affect. Mahapula *et al.* also indicate that 24 out of 62 of the preterm women had anxiety while 14 of the 62 preterm women had depression Preterm birth is established by Khalesi *et al.* to be positively influenced by change in pregnancy -specific anxiety [27]. We mentioned above that majority of preterm women was committed with antenatal visit but that doesn't mean they're committed with the right antenatal care as we saw out of 62 patients only 18 took progesterone or other tocolytic drugs and a lot of them almost half' was not observance their medical condition carefully We extend our work to El Beltagy *et al.* who are depicted as the majority of their preterm cases being delivered with at least antenatal visit despite that they list it as a risk factor but our study does not [4].

Conclusion

Preterm labour remains an important cause of perinatal mortality and a major issue. This study have describe

previous preterm labour, previous Caesarean section, Multiple pregnancy, cervical incompetence, Antepartum hemorrhage, premature rupture of membrane, family history of preterm labour, urinary tract infection, emotional disturbance (anxiety, depression) as major risk factors that have been associated with preterm labour, this will help to enable the author to understand which of these factors could be avoided in the next few years, or which of them could be reduced by education of the mothers and make them more openable on learning the right antenatal care.

Recommendation

Efforts should be directed to identifying the contribution of iatrogenic preterm delivery to the overall rate of preterm delivery and its causes in each country. We encourage health authorities to establish action plans, screening programs, evidence-based preventive measures, and health policies to target modifiable risk factors to prevent iatrogenic preterm delivery. Women at high risk of preterm birth (either a previous spontaneous preterm birth and/or sonographic short cervix) with a singleton gestation should be offered daily vaginal progesterone or weekly 17-OHPC treatment to prevent preterm birth. Benefit is most significant in those with prior history of preterm birth and a short cervix.

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