Al-Nahrain University

Collage Of Medicine

Department Of Pediatric

RISK OF PREMATURITY IN AL-KADHMIA TEACHING HOSPITAL

A thesis submitted to Al-Nahrain University / College Of Medicine to fulfil the requirement for M.B.ch.B.

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ ١

الْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ ٢

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صِرَاطَ الَّذِينَ أَنْعَمْتَ عَلَيْهِمْ

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وَلَا الضَّالِّينَ ٧

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Introduction

Definition: Live born infants delivered before 37 wk. from the 1st day of the last menstrual period are termed premature by the World Health Organization [1]

There are sub-categories of preterm birth, based on gestational age:

- extremely preterm (less than 28 weeks)
- very preterm (28 to 32 weeks)
- Moderate to late preterm (32 to 37 weeks).

Premature birth is a common &major problem encountered in the

Pediatrician practice. It is associated with a high risk of perinatal

Morbidity&mortality in addition to the cost &time of special care the

Premature children need in the hospital &in their future lives if

Complication occurred. And let's not forget the psychological &emotional burden on the family & especially mother [2]

Gestational age versus birth weight:

Even in developed countries, there is often uncertainty and incomplete recording of estimates of gestation. In most of the United Kingdom data on birth weight data but not on gestational age are collected routinely. Although some concordance exists between the categories of birth weight and gestational age, they are not interchangeable. The categories for birth weight are Low birth weight (< 2500 g) x Very low birth weight (< 1500 g) x extremely low birth weight (< 1000 g) only around two thirds of low birth weight infants are preterm. Term infants may be of low birth weight because they are "small for gestational age" or "light for date.

Preterm infants may also be small for gestational age. They may have neonatal problems additional to those related to shortened gestation, particularly if they are small because of intrauterine growth restriction. [3]

Incidence & Epidemiology:

For premature infants born with a weight below 1000 g, the three primary causes of mortality are respiratory failure, infection, and congenital malformation.

Low birth weight (LBW; birth weight of 2,500 g or less) is a Consequence of prematurity, poor intrauterine growth (IUGR, also Referred to as SGA), or both.
Over the past 20-30 years the incidence of preterm birth in most developed countries has been about 5-7% of live births. The incidence in the United States is higher, at about 12%.Some evidence shows that this incidence has increased slightly in the past few years, but the rate of birth before 32 weeks 'gestation is almost unchanged, at 1-2% [3]

More than 5% of deaths in children <5 yr.
Of age occur within the 1st mo. of life, with about half of the deaths attributable to prematurity. Approximately 8% of live born neonates in the United States weigh <2,500 g; the rate for blacks is almost twice that for whites. Over the past 2 decades, the LBW rate has increased primarily because of an increased number of preterm births registered as live births. Women whose first births are delivered before term are at increased risk for recurrent preterm delivery. [1]
Part of the apparent rise in the incidence of preterm birth, however, may reflect changes in clinical practice. Increasingly, ultrasonography rather than the last menstrual period date issued to estimate gestational age.

Perinatal care in developing countries, there are difficulties with population based data. Registration of births is incomplete and information is lacking on gestational age, especially outside hospital settings. Data that are collected tend to give only estimates of perinatal outcomes that are specific to birth weight. These data show that the incidence of low birth weight is much higher in developing countries than in developed countries with good care services [3]

Risk factors during pregnancy:

1-multiple pregnancies

2-the use of fertility medication that stimulates ovary to release multiple eggs and of IVF with embryo transfer of multiple embryos has been implicated as important factor in preterm birth

3-maternal medical conditions increase the risk of preterm such as high blood pressure, pre-eclampsia, diabetes, asthma, thyroid disease, heart disease.

4-Anatomical issues increase the risk of prematurity (weak or short cervix, previous cervical conization or loop excision, uterine malformations)

5-women with vaginal bleeding during pregnancy are the high risk for the preterm

6-women with abnormal amounts of amniotic fluid (polyhydramnios, oligohydramnios)

7-The mental status of the women is of significance (anxiety, depression) increase the risk.

8-The use of tobacco cocaine and excessive alcohol during pregnancy increase the risk

9-The risk is high among abused pregnant women than among non-abused women .10-Babies with birth defects are high risk of born preterm [6].
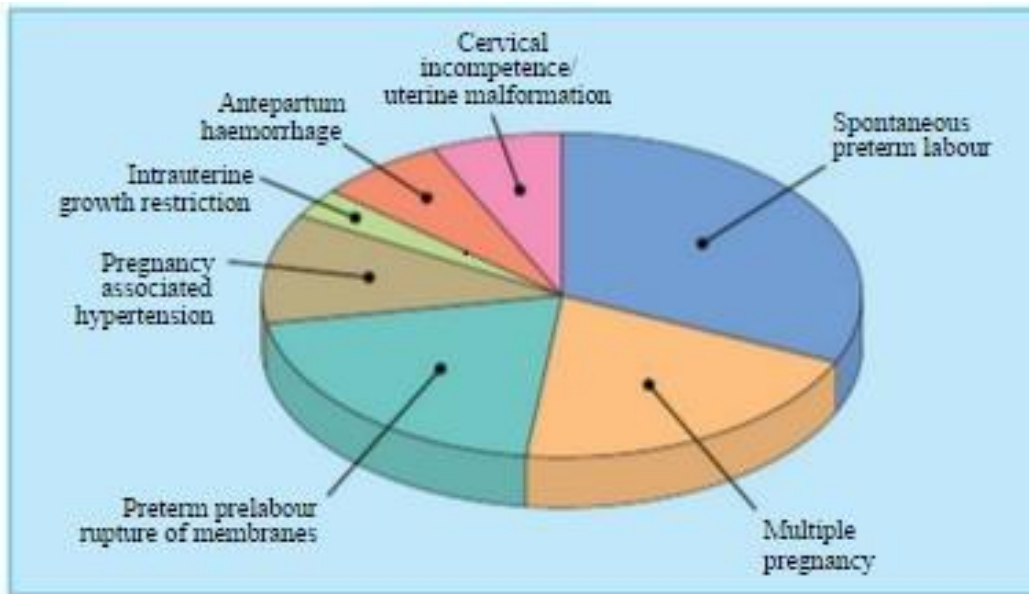
Figure 1: Causes of preterm birth [3]

Identifiable Causes of Preterm Birth
FETAL Fetal distress Multiple gestation Erythroblastosis Nonimmune hydrops
PLACENTAL Placental dysfunction Placenta previa Abruptio placentae
UTERINE Bicornuate uterus Incompetent cervix (premature dilation)
MATERNAL Preeclampsia Chronic medical illness (cyanotic heart disease, renal disease) Infection (*Listeria monocytogenes*, group B streptococcus, urinary tract infection, bacterial vaginosis, chorioamnionitis) Drug abuse (cocaine)
OTHER Premature rupture of membranes Polyhydramnios Iatrogenic Trauma

Table 1: causes of preterm birth. [1]

- Need for resuscitation at birth
- Respiratory
  - Respiratory distress syndrome (RDS)
  - Pneumothorax
  - Apnoea and bradycardia
- Hypotension
- Patent ductus arteriosus
- Temperature control
- Metabolic
  - Hypoglycaemia
  - Hypocalcaemia
  - Electrolyte imbalance
  - Osteopenia of prematurity
- Nutrition
- Infection
- Jaundice
- Intraventricular haemorrhage/periventricular leukomalacia
- Necrotising enterocolitis
- Retinopathy of prematurity
- Anaemia of prematurity
- Iatrogenic
- Bronchopulmonary dysplasia (chronic lung disease)
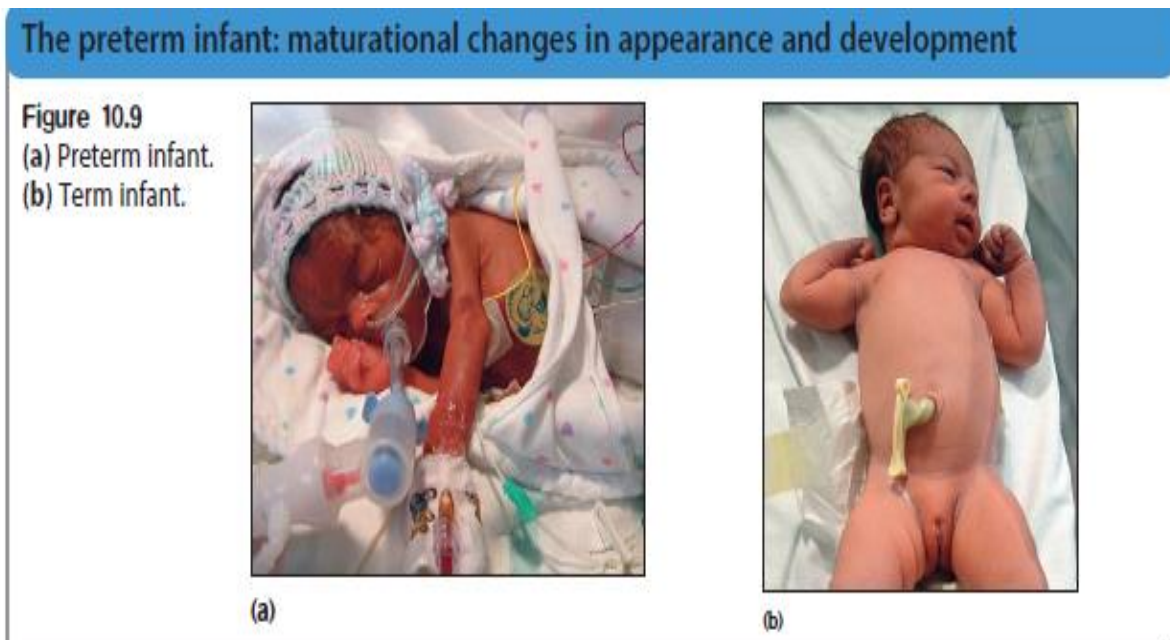- Inguinal hernias.

Table 2: Complications of preterm infants [7]

The preterm infant: maturational changes in appearance and development

Figure 10.9
(a) Preterm infant.
(b) Term infant.

(a) (b)

Figure 2: preterm infants [7]

Gestation	23–27 weeks	Term (37–42 weeks)
Birthweight (50th centile)	At 24 weeks – male 700 g, female 620 g	At 40 weeks – male 3.55 kg, female 3.4 kg
Skin	Very thin (Fig. 10.9a)	Thick skin (Fig. 10.9b)
	Dark red colour all over body	Pale pink colour
Ears	Pinna soft, no recoil	Pinna firm, cartilage to edge, immediate recoil
Breast tissue	No breast tissue palpable	One or both nodules >1 cm
Genitalia	Male – scrotum smooth, no testes in scrotum	Male – scrotum has rugae, testes in scrotum
	Female – prominent clitoris, labia majora widely separated, labia minora protruding	Female – labia minora and clitoris covered
Breathing	Needs respiratory support. Apnoea common	Rarely needs respiratory support. Apnoea rare
Sucking and swallowing	No coordinated sucking	Coordinated (from 34–35 weeks)
Feeding	Usually needs TPN (total parenteral nutrition), then tube feeding	Cries when hungry. Feeds on demand
Cry	Faint	Loud
Vision, interaction	Eyelids may be fused. Infrequent eye movements. Not available for interaction	Makes eye contact, alert wakefulness
Hearing	Startles to loud noise	Responds to sound
Posture	Limbs extended, jerky movements	Flexed posture, smooth movements

Table 3: comparison between preterm and term infants [7]

Prognosis

Mortality and morbidity are inversely proportional to gestational age and birth weight. Infants with extremely low birth weight (ELBW) who are born at tertiary care centers have outcomes more favorable than those who are born at level I or II centers and then transferred

Roberts et al found that children born at 22-27 weeks' gestation have high rates of adverse neurodevelopmental outcome at age 8 years. Assessment of a regional cohort of 144 survivors of preterm birth showed that, relative to matched term controls, the preterm cohort had substantially higher rates of blindness, deafness, cerebral palsy, and intellectual impairment and disabilities caused by these impairments. Comparison of preterm children born in 1997 with those born in 1991-1992 showed that the rates of

moderate or severe disability were similar in the two cohorts (19%), but the rate of mild impairment was greater in 1997 (40% vs. 24%); disability rates in control groups showed virtually no change over time .

Infants born at born at 23-25 weeks of gestation who receive antenatal exposure to corticosteroids appear to have a lower rate of mortality and complications compared with those who do not have such exposure. Infants born at at 34-36 weeks' gestation with antenatal exposure to corticosteroids between 24 and 34 weeks of gestation also appear to have a lower incidence of respiratory disorders. [5]

Preterm birth prevention programs and specialist clinics:

A number of dedicated PTB prevention clinics have been established and evaluated over recent years. The first evaluation of such a program was in California which included maternal education and increased clinic attendances, was reported to have achieved a significant 19% reduction in the PTB rate. More recent PTB prevention clinics have employed additional diagnostics and therapeutic interventions, including assessment of vaginal microbiology, fibronectin testing, ultrasound detection of shortened cervix, antibiotic use, progesterone therapy, cervical cerclage, and Arabin cervical pessaries. Most clinics treat women with a history of PTB or recurrent mid-pregnancy loss, previous PPROM, or previous loop excision or cone biopsy of the cervix. Manuck et al. found that in women who attended a dedicated PTB prevention clinic, recurrent PTB was considerably reduced (48.6% versus 63.4%), as was the rate of composite neonatal morbidity (5.7% versus 16.3%). The clinic consisted of three standardized clinic attendances, with routine administration of intramuscular 17-OHP and sonographic measurement of cervical length. [4]

Management:

1- Nursery care:

At birth, the measures needed to clear the airway, initiate breathing, Care for the umbilical cord and eyes, and administer vitamin K are the Same for immature infants as for those of normal weight and maturity Special care is required to maintain a patent airway.

Additional considerations are the need for (1) thermal control and Monitoring of the heart rate and respiration, (2) oxygen therapy, and (3) Special attention to the details of fluid requirements and nutrition.

Safeguards against infection can never be relaxed. Routine procedures

That disturb these infants may result in hypoxia. The need for regular special consideration and active participation by the parents in the infant's care in the Nursery, the need to instruct the mother in at-home care of her infant,

And the question of prognosis for later growth and development require. [1]

2- Stabilizing preterm or sick infants: [7]

Airway, breathing
• Respiratory distress: tachypnea, labored
Breathing with chest wall recession, nasal flaring,
Expiratory grunting, cyanosis
• Apnea

Management, as required:
• Clear the airway
• Oxygen
• High-flow humidified oxygen therapy
• CPAP (continuous positive airway pressure)
• Mechanical ventilation

Monitoring
• Oxygen saturation (maintain at 88–95%
If preterm)
• Heart rate
• Respiratory rate

• Temperature
• Blood pressure
• Blood glucose
• Blood gases
• Weight

Temperature control
• Place in plastic bag at birth to keep warm if
Extremely preterm
• Perform stabilization under a radiant warmer or
In a humidified incubator to avoid hypothermia

Venous and arterial lines
Peripheral intravenous line
Required for intravenous fluids, antibiotics and other drugs.
Umbilical venous catheter
May be used for intravenous access at resuscitation, in extremely
preterm infants for the first few days or to administer high
osmolality fluids (e.g. high concentration dextrose) or medications
needing central delivery (e.g. inotropes

Arterial line
• Inserted if frequent blood gas analysis, blood tests and
continuous blood pressure monitoring are required. Usually
umbilical artery catheter
(UAC), sometimes peripheral cannula if for short period or no
umbilical artery catheter possible.
• The arterial oxygen tension is maintained at
8–12 kPa (60–90 mmHg) and the CO2 tension at
4.5–6.5 kPa (35–50 mmHg). Continuous noninvasive
transcutaneous arterial blood gas monitoring may also be used.
Central venous line for parenteral nutrition,
If indicated
Inserted peripherally when infant is stable.
Chest X-ray with or without abdominal X-ray
Assists in the diagnosis of respiratory disorders and to confirm the
position of the tracheal tube and central lines.
Investigations
• Hemoglobin, neutrophil count, platelet count
• Blood urea, creatinine, electrolytes and lactate
• Culture – blood ± CSF ± urine
• Blood glucose
• CRP/acute phase reactant
• Coagulation screen if indicated

Antibiotics
Broad-spectrum antibiotics are given.

Minimal handling
All procedures, especially painful ones, adversely affect oxygenation and the circulation. Handling the infant is kept to a minimum and done as gently rapidly and efficiently as possible. Analgesia should be provided to prevent pain as necessary.
Parents
Although medical and nursing staff are usually fully occupied stabilizing the baby, time must be found for parents and immediate relatives to allow them to see and touch their baby and to be kept fully informed.

Aim of study

This case control study aims to identify the commonest risk factors contributing to premature birth in Alkadhmia teaching hospital.

Patients and methods

This descriptive study was done in Al-Imamain Al-Kadhimiyn medical city and the data were collected between 1st of December 2018 & 30th of February 2019 from pediatric department (6th floor) & neonatal care unit (2nd floor). The study consist of 90 case a 60 case of premature infant's bellow 37 gestational age (study group) & 30 case of mature infants above 37 gestational age as (control group)

Information regard history were collected from either parents or case sheet as shown in the questioner

We study the number and percentage of each risk factor in each group and we calculate the p-value

The p-value <0.05 was considered statically significant.

Prematurity study in Al-kadhimia teaching hospital

Patient name: _____

Maternal age: _____

Gestational age: _____

Prenatal care: good ☐   irregular ☐   -ve ☐

Number of births: _____

Number of abortions: _____

Type of delivery: NVD ☐   C/S ☐

History of premature births: yes ☐   no ☐

Anemia: ☐   preeclampsia: ☐

PROM: ☐   oligohydraminos: ☐

Smoking: yes ☐   no ☐

Current twin pregnancy: yes ☐   no ☐

Vaginal bleeding: yes ☐   no ☐

If yes --> 1st tri. ☐   2nd tri. ☐   3rd tri. ☐

Inter gestational interval less than 1 year: yes ☐   no ☐

Results

The data that collected from 1st of October to 30th of February shows that the number of delivery's were 4298 , and from those the number of prematurity's were 1322(31%) , and number of prematurity deaths were 121(3%)
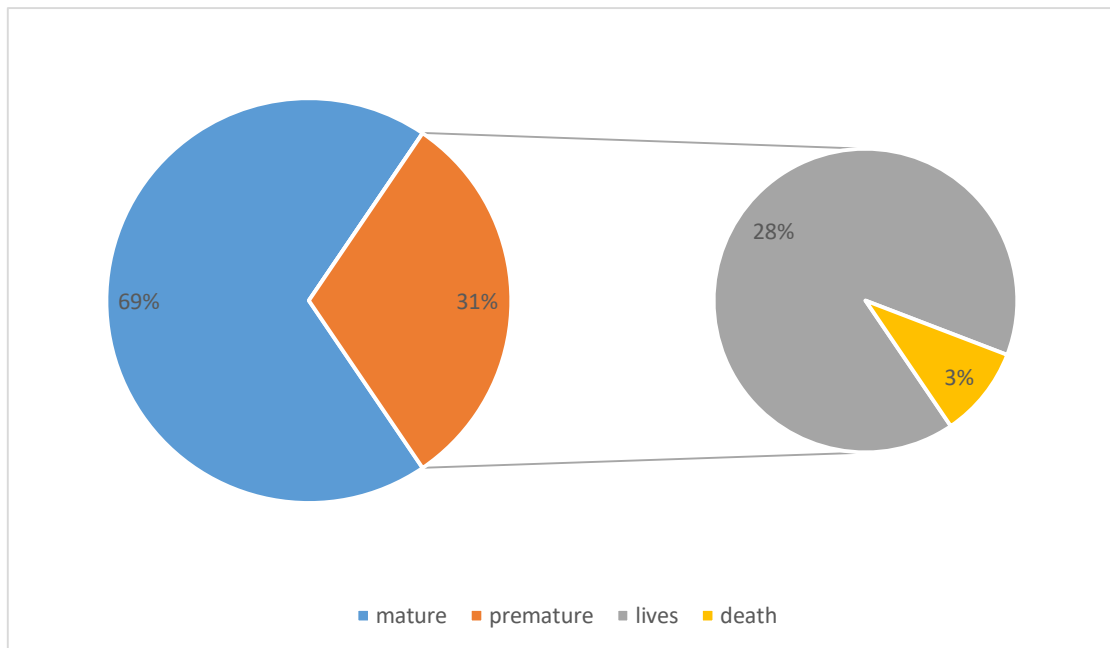

Chart 1: Prevalence of prematurity in Alkadhmia teaching hospital.

There was no relationship between mother age and the percentage of prematurity, but lower intergestational interval less than1 year was associated with a higher percentage of prematurity in spite of p-value was not significant as shown in table 1.

Table 1: **Demographic data of mothers**

demographic data	Premature n (%)	Control n (%)	p-value
Age			
<20 years	7(11.6%)	5(16.6%)	
20-35 years	40(66.6%)	19(63.3%)	0.804
> 35 years	13(21.6%)	6(20%)	
no. of births			
1_2	21(35%)	10(33.3%)	
3	11(18.3%)	4(13.3%)	0.7
>=4	28(46.6%)	16(53.3%)	
intergestational interval			
< 1 year	27(45%)	8(26.6%)	0.09
> 1 year	33(55%)	22(73.3%)	
smoking			
yes	2(3.3%)	0(0%)	0.5
no	58(96.7%)	30(100%)	

In this table the incidence of prematurity increase in

- Previous abortion (p-value <0.01)
- Type of delivary   C/S (p-value 0.002)
- Anemia (p-value 0.01)
- PROM (0.02)

Table 2: comparison of risk factors between premature and control group.

risk factors	Premature n (%)	Control n (%)	p-value
prenatal care			
good	33(55%)	21(70%)	
irregular	27(45%)	9(30%)	0.17
absent	0(0%)	0(0%)	
previous abortion			
yes	21(35%)	10(33.3%)	<0.01
no	39(65%)	20(66.6%)	
type of delivery			
vaginal	16(26.6%)	18(60%)	0.002
C/S	44(73.4%)	12(40%)	
Hx of premature birth			
yes	17(28.3%)	8(26.6%)	0.8
no	43(71.7%)	22(73.3%)	
anemia			
yes	24(40%)	20(66.6%)	0.01
no	36(60%)	10(33.3%)	
preeclampsia			
yes	19(31.6%)	6(20%)	0.2
no	41(68.4%)	24(80%)	
PROM			
yes	16(26.6%)	2(6.6%)	0.02
no	44(73.4%)	28(93.3%)	
oligohydraminos			
yes	15(25%)	3(10%)	0.09
no	45(75%)	27(90%)	
current twin pregnancy			
yes	9(15%)	4(13.3%)	0.8
no	51(85%)	26(86.6%)	
vaginal bleeding			
yes	9(15%)	4(13.3%)	0.8
no	51(85%)	26(86.6%)	

Discussion

Our study show no relationship between mother age and increase percentage of prematurity and this result is similar to the result of Margarita E.Ahumada-Barrios in German [8] but disagree from Najmeh Tehranian in Iran result(age>35 associated with increase percentage of prematurity)[9]

Our study show no relationship between number of birth & increase percentage of prematurity this result is similar to the Margarita E.Ahumada-Barrios in German [8] but disagree from Ezechi oc,Makinde ON in the south western Nigeria(which show that mothers with 4 child and above associated with increased risk of prematurity) [10]

In spite of p-value is not significant in intergestational interval <1year, there was increase percentage of prematurity and this result is similar to the Yun-ping zharg in china [10]

Our study show that the prenatal care has no relationship with increase percentage of prematurity and this result is similar to the Yun-ping zharg in china [10] but disagree with the Margarita E.Ahumada-Barrios in German [8]

Our study show that previous abortion has a significant P-value (<0.01) & there is negative relationship with increase percentage of prematurity and this result is similar to the Margarita E.Ahumada-Barrios in German [8] & Ezechi oc,Makinde ON in the south western Nigeria [10] but disagree with Najmeh Tehranian in Iran [9]

The type of delivery has a significant P-value (0.002) & there was a relationship between C/S and increase percentage of prematurity and this result disagree with Ezechi oc, Makinde ON in the south western Nigeria [10]

In spite of that p-value is not significant in relationship between history of prematurity and risk of prematurity but mother with no history of prematurity show increase percentage of prematurity and this result is similar to the

Margarita E.Ahumada-Barrios in German [8] & Ezechi oc, Makinde ON in the south western Nigeria [10]

Our study show a significant relationship between patient without anemia and risk of prematurity (p-value 0.01) but this result disagree with result of Margarita E.Ahumada-Barrios in German [8] which show that mother with anemia associated with increase percentage of prematurity.

Our study show no relationship between preeclampsia and increase percentage of prematurity (P-value 0.2) and this result disagree with Margarita E.Ahumada-Barrios in German [8] & Najmeh Tehranian in Iran [9]

PROM has a significant P-value (0.02) in relationship between mother without PROM and increase percentage of prematurity and this result is similar to result of Margarita E.Ahumada-Barrios in German [8] & disagree with result of Najmeh Tehranian in Iran [9]

Our study show no relationship between oligohydraminos and increase risk of prematurity (p-value 0.09) but mothers without oligohydraminos show increase risk of prematurity and this result is similar to the Margarita E.Ahumada-Barrios in German [8]

Our study show no relationship between current twin and increase risk of prematurity(p-value 0.8) but mothers without current twin show increase risk of prematurity and this result is similar to the Margarita E.Ahumada-Barrios in German [8]

Our study show no relationship between vaginal bleeding and increase risk of prematurity (p-value 0.8) but mothers without vaginal bleeding show increase risk of prematurity and this result is similar to the Margarita E.Ahumada-Barrios in German [8]

Conclusion

From the result of this study, we conclude the following points:

- ✓ The age group of the mothers with the highest percentage of prematurity is 20-35 y
- ✓ Mothers with number of births more than 4 have the highest percentage of prematurity
- ✓ Intergestational interval < 1year has the highest percentage of prematurity
- ✓ History of previous abortion, anemia, <1 year intergestational interval and PROM were all significantly associated with prematurity
- ✓ Although; not significant statistically; there was large percentage of previous prematurity; preeclampsia; history of vaginal bleeding; twin pregnancy; oligohydraminos and irregular prenatal care among premature group than control group.

Recommendations

We recommend to include large number of patients in the future studies to assess the risk factors of prematurity

Programs to educate the mothers about the risk factors of prematurity and the importance of consulting doctors for treatment of problems such as early rupture of membranes and twin pregnancy

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