**Risk Factors For Pre-term Labor in Bint-Alhuda Teaching Hospital** in **2019**

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## العلم

##  هو الطريق للحياة..

##  السعيدة الفاضلة..

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**♦ Abstract :**

 Preterm birth (PTB)is a major clinical problem associated with perinatal mortality and morbidity. The aim of the present study is to identify risk factors associated with PTB in Bint-Alhuda Teaching Hospital

**♦ INTRODUCTION:**

 Preterm birth (PTB) is the leading cause of infant morbidity and mortality in the world. The World Health Organization (WHO) defines preterm birth as any birth before 37 completed weeks of gestation or fewer than 259 days since the first day of woman’s last menstrual period (LMP).

In developing countries, the main causes of preterm births include infectious diseases and poor availability and accessibility of health care resources. In high-income countries, the increase in the number of preterm births is linked to conception among older women and increased number of multiple pregnancies as a result of usage of fertility drugs. In some developed countries, medically unnecessary inductions and caesarean section deliveries before full term also increase preterm birth rates. In rich and poor countries, many preterm births remain unexplained [[1](https://www.hindawi.com/journals/isrn/2014/935982/#B1), [2](https://www.hindawi.com/journals/isrn/2014/935982/#B2)].

Approximately three-fourths of perinatal deaths occur in fetuses that are delivered at <37 weeks, and about 40% of these deaths occur in those delivered at <32 weeks. In addition to its contribution to mortality, preterm birth has lifelong effects on neurodevelopmental functioning such as increased risk of cerebral palsy, impaired learning, and visual disorders and an increased risk of chronic disease in adulthood [[3](https://www.hindawi.com/journals/isrn/2014/935982/#B3)]. The economic cost of preterm birth is high in terms of neonatal intensive care and ongoing health care and educational needs. The social cost is also high, with many families experiencing the sudden loss of a preterm baby or a stressful hospital stay, sometimes for months [[2](https://www.hindawi.com/journals/isrn/2014/935982/#B2)].

Defining risk factors for prediction of preterm birth is a reasonable goal for several reasons. First, identification of at-risk women allows initiation of risk-specific treatment. Second, the risk factors might define a population useful for studying specific interventions. Finally, identification of risk factors might provide important insights into mechanisms leading to preterm birth. Yet, data regarding preterm births and risk factors are not routinely collected in hospitals. Therefore, to obtain insight into the risk factors for PTB

**Overview of Risk Factors**

**In vitro fertilization (IVF)**

Pregnancies that result from IVF are at a higher risk of preterm birth and low birth weight.

**Twins and triplets**

Preterm labor occurs in twins and triplets because of larger uterine size, cervical weakness, growth abnormalities and complications with the placentas.

**Vaginal bleeding**

Vaginal bleeding in the first and second trimester is associated with an increased risk of premature birth. The risk is higher the longer during the the bleeding lasts. Placenta previa and placenta abruption are risk factors for early delivery in the third trimester.

**Previous pregnancy**

**Short time between pregnancies**

The risk of premature birth is increased when getting pregnant within 18 to 23 months of a delivery.

**History of miscarriage**

Recurrent early miscarriage, miscarriage in the second trimester (14 to 26 weeks) and induced abortion are small risk factors for preterm birth.

**Previous twin pregnancy**

A previous preterm birth of a twin pregnancy increases the risk of a preterm birth in future pregnancies, especially if the twin preterm birth occurred at an early gestational age.

**History of preterm birth**

A previous preterm birth is one of the strongest risk factors for future preterm delivery. The risk is highest when the most recent pregnancy resulted in a preterm birth, especially if the delivery was prior to 34 weeks, and if there is a history of more than one preterm birth.

**Lifestyle factors**

**Smoking and secondhand smoke**

Cigarette smoking is a proven risk factor for preterm birth.

**Sex during pregnancy**

Good news! There is no evidence that sexual intercourse causes premature birth.

**Physical activity and work**

Studies have not clearly shown that certain activities like prolonged standing, heavy lifting, bending over, or long work hours cause premature birth. However, there may be some activities that contribute to a women’s overall risk. Talk with your doctor to see what activities you should avoid.

**Weight and weight changes**

Women with a prepregnancy weight under 100 pounds or over 250 pounds are at increased risk for preterm birth. Preterm birth in obese women is often from complications related to high blood pressure and diabetes but these women are also at increased risk of premature rupture of membranes. Too little and too much weight gain during pregnancy is also a risk factor for premature birth.

**Health and family history**

**Short cervix**

Multiple studies have shown that a short cervical length is associated with an increased risk of premature delivery.

**Maternal age and race**

Women over the age of 35 are at an increased risk for preterm birth as are women who are African-American, Hispanic and Native American.

**Family history**

There is some evidence that family history of preterm birth on the women’s side is a risk factor for premature birth. There is a slight increased risk of early delivery if the pregnant women herself was born premature.

**Uterus shape**

The normal uterus is pear-shaped but some women are born with an abnormally shaped uterus that can result in premature birth. The uterus can also be abnormal from solid masses that grow in the uterine muscle called fibroids, but they can be removed surgically if necessary.

**Infection**

Bacteria and viruses can work their way into the amniotic fluid and baby through the blood stream or through the cervix. Women are usually unaware of the developing infection until they are having preterm contractions and a fever. Unfortunately, there is no effective method to prevent or treat these infections and, when diagnosed, delivery is the only option.

**The Aim Of The Study**

The aim of this study is to identify local risk factors that could be targeted to reduce the risk of PTB in Bint-Alhuda Teaching Hospital

**♦ Methods:**

 A case-control study design was used. Cases were defined as pregnant women with a live PTB (29–<37 weeks) by vaginal delivery or caesarean section. Controls were defined as pregnant women admitted to the same hospital with a full-term live birth (≥37 weeks) by vaginal delivery or caesarean section. In general, pre-term cases were diagnosed in advance by the resident specialist. All eligible cases present during the study hospital visits were approached in the postpartum recovery room following the birth. A total of 100 cases were selected and 100 of them agreed to participate in the study. Each case was assigned a control, a woman in the nearest adjacent bed to the case participant who met the selection criteria. All subjects approached agreed to participate in the study. All cases and controls were interviewed face-to-face using a specially designed questionnaire. In addition to general background information, respondents were asked questions

about suspected risk factors. Socio-economic status

was scored according to the presence or absence of a private car (scored as 1 or 0) and the number of electric appliances in the household (up to 2 = 1, 3 to 5 = 2, 6 or more = 3). Living quarters were categorized as adequate and inadequate, the latter consisting of tents, mud huts and/or in partially built houses with no water or electricity supply. An overall socio-economic status score was calculated for each subject; a score of 2 or less indicated low socioeconomic status and a score of 3 or more was defined as moderate to high socioeconomic status. Information was also collected on the frequency of meat consumption; occasionally (once a week or less), frequently, or regularly (twice a week or more). Information about suspected risk factors for the present pregnancy and past obstetric history were obtained from the patient and/or from the clinical case record as applicable. The diagnosis of cervical incompetence was taken from clinical case notes (defined as dilatation of the cervix 2 cm or more in the first trimester by US examination). The patient was asked about the diagnosis and treatment of four conditions during pregnancy: diabetes, typhoid fever, urinary tract infections and genital tract infections. Finally, emotional disturbances occurring during pregnancy were assessed by two questions assessing severe fright and anxiety. Severe fright was defined as hearing unexpected bad news and/or experiencing military actions. Anxiety was assessed using a scale adopted by the American Psychiatric Association [23]. This includes a list of six questions regarding stressful life events including: restlessness, easy fatigability, muscular tension, sleep disturbances, irritability and difficulties concentrating. The presence of anxiety was established when the score was positive for ≥50% of the six questions. Odds Ratios (OR) and 95% Confidence Intervals (CI) for the OR were calculated. The p value was based on the value of Z; a p value > 0.05 was not significant (NS). The dependent variable of the logistic regression was the presence or absence of PTB. A stepwise forward logistic regression was used. All variables were included in the initial analysis; the variable with the strongest association was estimated first, followed by all significant variables.

♦ **Results:**

 A total of 100 cases were included in the study. Table 1 shows the age distribution of the study population. A high-risk association was observed between PTB and pregnancy at young ages = 19 years, with an OR= 4.90.

Table 1: Distribution of study population by age.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Age groups (years)** | **Cases (no.)** | **Controls (no.)** | **OR** | **95% CI** | **P value** |
| <19 | 11 | 10 | 4.90 | 2.38–10.09 | <0.001 |
| 20–29 | 45 | 56 | 1.00 | - | - |
| 30–34 | 31 | 21 | 0.72 | 0.45–1.17 | NS |
| 35–39 | 9 | 10 | 0.56 | 0.30–1.04 | NS |
| 40 | 4 | 3 | 1.43 | 0.62–3.30 | NS |
| all ages | 100 | 100 | - | - | - |

**Table 2: Distribution of cases and controls according to socio-economic background**

**Variables Cases (no.) Controls (no.) OR 95% CI P value**

**1. Frequency of meat consumption**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| occasional | 63 | 64 | 3.62 | 2.16–4.92 | <0.001 |
| moderate-high | 37 | 36 |  |  |  |
| **2. Manual work** |  |  |  |  |  |
| heavy | 61 | 73 | 2.80 | 1.86–4.23 | <0.001 |
| usual | 39 | 27 |  |  |  |
| **3. Socio-economic status** |  |  |  |  |  |
| low | 33 | 41 | 2.60 | 1.63–4.15 | <0.001 |
| moderate-high | 67 | 59 |  |  |  |
| **4. Occupation** |  |  |  |  |  |
| housewife | 88 | 90 | 2.02 | 0.37–11.16 | N.S |
| worker | 12 |  10 |  |  |  |
| **5. Level of education** |  |  |  |  |  |
| illiterate | 4 | 11 | 2.67 | 1.78–4.00 | <0.001 |
| 6 years | 26 | 23 | 0.45 | 0.30–0.68 | <0.001 |
| >6 years | 70 | 66 | 1.00 | - | - |
| **6. Presence of domestic animal** |
| present | 12 | 8 | 4.93 | 2.72–8.93 | <0.001 |
| absent | 88 | 92 |  |  |  |
| **7. Housing** |  |  |  |  |  |
| inadequate | 17 | 10 | 1.77 | 0.79–3.97 | NS |
| adequate | 83 | 90 |  |  |  |

Table 2 reveals the socio-economic background of the study population. Almost all study subjects were house- wives. A significant risk association was present between PTB and occasional meat consumption (OR = 3.26), heavy manual work (OR = 2.80), low socio-economic sta- tus (OR = 2.60), illiteracy (OR = 2.67) and caring for domestic animals (OR = 4.93).

The associations between PTB and other suspected risk factors are presented in Table 3. Among the risk variables of the current pregnancy and past obstetric history, those showing a significant risk association with PTB were cervical incompetence (OR = 3.11), multiple pregnancy (OR = 6.89), previous PTB (OR = 35.12), and direct trauma to the abdomen (OR = 3.86). Table 3 also illustrates a positive risk association between PTB and urinary tract infection (OR = 2.78), anxiety (OR = 1.80), more frequent antenatal visits due to pregnancy complications (OR = 2.04) and typhoid fever (OR = 2.40). The latter, however, does not reach statistical significance.

**Table 3: Distribution of study population according to other suspected risk factors.**

**Variables Cases (no.) Controls (no.) OR 95% CI P value**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parity** |  |  |  |  |  |
| 0–2 | 48 | 44 | 1.00 | - | - |
| 3 | 12 | 9 | 0.95 | 0.52–1.75 | NS |
| 4 | 10 | 7 | 0.91 | 0.49–1.68 | NS |
| 5+ | 30 | 40 | 1.06 | 0.65–1.72 | NS |
| all categories | 100 | 200 | - | - | - |
| **Risk variables of present pregnancy** |
| cervical incompetence | 33 | 19 | 3.11 | 1.73–5.58 | <0.001 |
| multiple pregnancy | 16 | 22 | 6.89 | 2.00–23.69 | <0.001 |
| accidental hemorrhage | 15 | 7 | 2.31 | 0.70–7.64 | NS |
| genital tract infection | 36 | 24 | 1.09 | 0.69–1.74 | NS |
| **Obstetric history** |  |  |  |  |  |
| previous PTB | 30 | 1 | 35.12 | 4.74–260.32 | <0.001 |
| abortion | 3 | 1 | 3.03 | 0.31–29.38 | NS |
| PPROM | 14 | 10 | 1.43 | 0.62–3.30 | NS |
| **Medical disease** |  |  |  |  |  |
| typhoid fever | 16 | 7 | 2.40 | 0.97–5.97 | NS |
| diabetes | 2 | 1 | 2.01 | 0.18–22.35 | NS |
| urinary tract infection | 82 | 40 | 2.78 | 1.78–4.35 | <0.001 |
| **Emotional disturbances** |  |  |  |  |  |
| severe fright | 37 | 63 | 1.10 | 0.72–1.67 | NS |
| anxiety | 57 | 60 | 1.80 | 1.19–2.72 | <0. 01 |
| **antenatal visits due to pregnancy complications** |
| 0 | 25 | 30 | 1.00 | - | - |
| 1–3 | 30 | 36 | 0.53 | 0.35–0.80 | <0.001 |
| 4 | 55 | 34 | 2.04 | 1.37–3.04 | <0.001 |
| **cigarette smoking** |  |  |  |  |  |
| smokers | 4 | 5 | 0.80 | 0.21–3.02 | NS |
| **long travel and trauma to abdomen** |
| history of long travel | 21 | 19 | 0.91 | 0.60–1.39 | NS |
| trauma to abdomen | 31 | 14 | 3.86 | 2.04–7.30 | <0.001 |

Finally, a forward logistic regression model for the occur- rence of PTB is presented in Table 4. Almost all risk factors found to be significantly associated with PTB remained significant in this analysis, except for age, socio-economic status, education and previous PTB.

**Table 4: Forward logistic regression model for the occurrence of PTB.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **variables** | **OR** | **p-value** |  | **95% CI** |  |
|  |  |  | **lower** |  | **upper** |
| anxiety | 2.16 | <0.001 | 1.28 |  | 3.64 |
| occasional meat consumption | 4.33 | <0.001 | 2.60 |  | 7.22 |
| Presence of and caring for domestic animal | 5.06 | <0.001 | 2.44 |  | 10.58 |
| manual work | 1.70 | <0.05 | 1.02 |  | 2.84 |
| urinary tract infection | 2.85 | <0.001 | 1.63 |  | 4.98 |
| direct trauma to the abdomen | 3.76 | <0.001 | 1.77 |  | 7.98 |
| abortion | 6.36 | <0.001 | 2.77 |  | 14.63 |
| cervical incompetence | 4.74 | <0.001 | 2.29 |  | 9.79 |
| multiple gestation | 7.51 | <0.01 | 1.89 |  | 29.87 |

♦ **Discussion:**

 A case-control study design was conducted in which the response rate for the cases was 93% and for the controls 100%. Cases that declined to participate in the study cited fatigue as the reason. Recall bias is certainly one of the major limitations of a case-control study. This, however, is thought to be relatively moderate since the factors being assessed were related to pregnancy, which many women recall vividly. This assumption is reinforced by the fact that mothers were interviewed very soon after birth and after a thorough explanation of the study's aims. Efforts were also made to establish rapport between investigators and the study population.

PTB is one of the most common obstetric problems, and pre-term neonates are more likely to die than full-term infants. Furthermore, those who survive run a greater risk of disability [1,2]. In the crude analysis a significant risk association was found between PTB and women who con- ceived at younger but not at older ages. Age, however, became insignificant in the regression analysis when con- trolling for other variables. Contradicting results have been observed in other studies between the age of the mother at conception and PTB [11,23]. No significant association was observed between PTB and parity. Some cross-sectional analyses have reported an association with high parity, while others showed no effect of parity on the occurrence of PTB [24].

Frequency of meat consumption was used as an indicator of the woman's nutritional status and the study found that occasional as opposed to frequent meat consumption was significantly associated with PTB. Meat is expensive in Iraq and only higher-income families can afford frequent consumption. Meat is also considered to be an essential source of iron, and iron deficiency anemia has been regarded as a risk factor for PTB [25]. In Iraq such anemia is frequent among women and may be directly linked to lack of meat consumption [26]. Moreover high-risk pregnancies have been significantly more prevalent among malnourished women [27].

Poor socio-economic background and illiteracy were also both found to be significantly associated with PTB. Similarly, significant associations were observed between PTB and heavy manual work and caring for domestic animals. All these conditions are interrelated and are proxies for low socio-economic status. This might explain why some of these factors became insignificant predictors of PTB in the forward logistic regression analysis. Similar results have been reported elsewhere. Other studies have also found that limiting the amount of work done by pregnant women and avoiding fatigue helps reduce the risk of PTB [8-10,13,15]. The study also revealed significant risk associations between the presence of cervical incompetence, multiple pregnancies and previous PTB. This, too, is in accordance with other studies [9,12,13,17]. Accidental hemorrhage has also been suspected as a risk factor [19].In the present study, an OR of 2.31

Urinary tract infections were found to be a significant risk factor for PTB in this study, which reflects findings in some other studies [8]. No association, however, was observed between PTB and genital tract infection. Other studies are inconclusive. Although similarly negative associations have been reported, some other studies have found a positive association, particularly with trichomoniasis, bacterial vaginosis and mycoplasmal infections [21,29]. The failure in this study to find a positive association might be due to the study design. The incidence of these infections was determined by clinical case histories only and no direct laboratory results were available to the authors. It is possible that women may confuse the two infections or may be more prone to report urinary rather that genital infections.

The study also investigated the possible association of PTB with histories of other medical diseases. Only two cases of diabetes were observed among cases and one among controls. Typhoid fever (OR = 2.40) is relatively common in Iraq and patients usually correctly recall its history and treatment. The association between PTB and typhoid fever should be further investigated and documented by laboratory tests. Similar results elsewhere also associated maternal pyrexial illnesses with PTB [1].

Other studies have revealed controversial results for an association between smoking and PTB [30]. In this study too few smokers were observed to draw a valid conclusion. Due to social sitgma women in Iraq have been reluctant to state their smoking habits [22], so it is possible that the presence of smokers in this study has been underreported. With regard to long distance travel, our findings agree with Schoemanet al [32] in that it does not present

a significant risk of PTB. Other studies, however, have found a significant association [15]. Direct trauma to the abdomen was reported by 45 cases and 14 controls and the association was significant, reflecting the findings of other studies [11,12].

Not surprisingly, the study found that cases had under- gone a greater number of antenatal care visits than had the controls, mainly for pregnancy complications. The cover- age of antenatal care is very low in Iraq, about 30%, and antenatal visits are mainly made for high-risk pregnancies[34]. The findings of this study support the view that women diagnosed with problems that may lead to PTB are more prone to use antenatal care services than others.

Stress, anxiety and other psychological disturbances have been suspected as risk factors for PTB [7,15,23]. It is a common belief in Iraqi communities that PTB is associated with anxiety and severe fright, and in the last two years stressful life events have increased in this country. The study confirmed a significant association between anxiety and PTB. It has been claimed that stress and anxiety increases corticotrophin-releasing hormones and may ultimately result in increased uterine contractility. Stress also increases cytokine production, which may independently lead to PTB or increase susceptibility to infection and subsequent PTB [35].

Many of the suspected risk factors listed above are interrelated with each other and probably with some other co-factors. Nevertheless, the majority of significant associations observed in the study remained so after conducting a forward logistic regression analysis

♦ **Conclusion:**

 Pregnant women are a particularly vulnerable group. They face the consequences of poor nutrition and even malnutrition, low socio-economic standards, infections and exposure to stress and anxiety. All these risk factors, which have been found to be associated with PTB, are modifiable. They should be taken into consideration in the planning of a preventive program to decrease PTB and its sequela for mortality and morbidity among infants in Bint-Alhuda Teaching Hospital .

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♦ **References:**

1. Lumley J: [Defining the problem: The epidemiology of preterm birth.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=12763104) BJOG 2003, 110(suppl 20):3-7.
2. Moutquin J: [Classification and heterogenicity of preterm birth.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=12763108)

BJOG 2003, 110(suppl 20):30-33.

1. Lawn JE, Cousens S, Zupan J: [Lancet Neonatal survival steering team. 4 million neonatal deaths: When? Where? Why.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=15752534) Lancet 2005, 365(9462):891-900.
2. Wen SW, Smith G, Yang Q, Walker N: [The epidemiology of pre- term birth and neonatal outcome.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=15691780) Semin Fetal Neonatal Med 2004, 9(6):429-435.
3. Bibby E, Stewart A: The epidemiology of preterm birth. Neuro Endocrinol Lett 2004, 25(supp l):43-47.
4. Zeitlin J, Bucourt M, Rivera L, Topuz B, Papiernik E: [Preterm birth and maternal country of birth in a French district with a mul- tiethnic population.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=15270935) BJOG 2004, 111(8):849-855.
5. Savitz DA, Kaufman JS, Dole N, Siega-Riz AM, Thorp JM Jr, Kaczor DT: [Poverty, education, race and pregnancy outcome.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=15328932) Ethn Dis 2004, 14(3):322-329.
6. Sadoon I, Hassan M: Incidence and risk factors of prematurely in Basrah, Iraq. JABMS 2001, 3(l):100-103.
7. Muggah E, Way D, Muirhead M, Baskerville B: Preterm delivery among Inuit women in the Baffin region of the Canadian Arctic. Int J Circumpolar Health 2004, 63(supp 2):242-247.
8. Cisse CT, Mbaye M, Faye Dieme ME, Traore AL, Moreau JC: [Previ- ous induced abortions and the risk of very preterm delivery: results of the EPIPAGE study.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=15777440) BJOG 2005, 112(4):430-437.
9. Jacobsson B, Ladfors L, Milsom I: [Advanced maternal age and adverse prenatal outcome.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=15458893) Obstet Gynecol 2004, 104(4):727-733.
10. Krymko H, Bashiri A, Smolin A, Sheiner E, Bar-David J, Shoham-Vardi I, Vardi H, Mazor M: [Risk factors for recurrent preterm deliv- ery.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=15063953) Eur J Obstet Gynecol Reprod Biol 2004, 113(2):160-163.
11. Ezechi OC, Makinde ON, Kalu BE, Nnatu SN: [Risk factors for pre- term delivery in South Western Nigeria.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=12881078) J Obstet Gynaecol 2003, 23(4):387-391.
12. Pollack H, Lantz PM, Frohna JG: [Maternal smoking and adverse birth outcomes among singletons and twins.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=10705857) Am J Public Health 2000, 90(3):395-400.
13. Moutquin JM: Socio-economic and psychological factors in the management and prevention of preterm labor. BJOG 2003, 110(supp 20):56-60.
14. El-Kady D, Gilbert WM, Anderson J, Danielsen B, Towner D, Smith LH: [Trauma during pregnancy, an analysis of maternal and fetal outcomes in a large population.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=15284764) Am J Obstet Gynecol 2004, 190(6):1661-1668.
15. Kurdi AM, Mesleh RA, Al-Hakeem MM, Khashoggi TY, Khalifa HM[: Multiple pregnancy and preterm birth.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=15138532) Saudi Med J 2004, 25(5):632-637.
16. Althuisius SM, Dekker GA: [Controversies regarding cervical incompetence, short cervix and the need for cerclage.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=15519424) Clin Perinatol 2004, 31(4):695-720.
17. Nguyen N, Savitz DA, Thorp JM: [Risk factors for preterm birth in Vietnam.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=15207686) Int J Gynaecol Obstet 2004, 86(l):70-78.
18. Wright SP, Mitchell EA, Thompson JM, Clements MS, Ford RP, Stew- art AW: [Risk factors for preterm birth: a New Zealand study.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=9484428) N Z Med J 1998, 111(1058):14-6.
19. Brown D Jr: [Clinical variability of bacterial vaginosis and tri- chomoniasis.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=15568400) J Reprod Med 2004, 49(10):781-786.
20. American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders 4th edition. Washington DC; 2000:211. Text revi- sion, (DSM-IV-TR)
21. da Silva AA, Simoes VM, Barbieri MA, Bettiol H, Lamy-Filho F, Coim- bra LC, Alves MT: [Young maternal age and preterm birth.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=14629314) Pae- diatr Perinat Epidemiol 2003, 17(4):332-339.
22. Main DM, Grisso JA, Wold T, Snyder ES, Holmes J, Chiu G[: Extended longitudinal study of uterine activity among low risk women.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=1957855) Am J Obstet Gynecol 1991, 165(5):1317-1322.
23. Little Mp, Brocard P, Elliott P, Steer PJ: [Hemoglobin concentra- tion in pregnancy and prenatal mortality: a London based cohort study.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=16021083) Am J Obstet Gynecol 2005, 193(1):220
24. Wasiela M, Krzeminski Z, Hanke W, Kalinka J: [Association between genital mycoplasmas and risk of preterm delivery.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=15537264) Med Wieku Rozwoj 2003, 7(3 suppl 1):211-216.
25. Bader LK, Abdullah B, Mahmoud A: [Precursors of preterm birth: comparison of three ethnic groups in the middle East and the United States.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=16020412) J Obstet Gynecol Neonatal Nurs 2005, 34(4):444-452.
26. Schoeman J, Grove DV, Odendaal HJ: [Are domestic violence and excessive use of alcohol risk factors for preterm birth?](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=15601648) J Trop Pediatr 2005, 51(1):49-50.
27. Maupin R Jr, Lyman R, Fatsis J, prystowiski E, Nguyen A, Wright C, Kissinger P, Miller J Jr: [Characteristics of women who deliver with no prenatal care.](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&amp;db=PubMed&amp;dopt=Abstract&amp;list_uids=15370082) J Matern Fetal Neonatal Med 2004, 16(1):45-50.
28. Al-Getachi WF, Khattab Gh: Evaluation of maternal and child health services in a primary health care centre in Mosul. Ann Coll Med Mosul 2001, 27(2):43-48.
29. Gennaros S, Hennessy MD: Psychological an