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Research Article

The Involvement of Some Maternal and Fetal Factors in Premature Birth

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Abstract

The study refers to premature births recorded over a period of 5 years, within the Obstetrics-Gynecology Clinic of Craiova: premature births represented 9.07% of all births. Maternal factors such as: the age of the pregnant woman: under 20 years old, 23.2%, parity 25.5% are over 35 years old, health state 2.35%, no pregnancy in the last trimester, rural area 61.5%, degree of prematurity (3rd degree) 16.8%, premature stillbirths 13.2%, premature births from twin pregnancy 4.43%. The conclusions highlighted the increased risk of premature birth.

Keywords: Premature Birth; Causes of Prematurity; Infertility; Rural Environment.

Introduction

Premature birth is birth before 37 weeks of gestation (between 28-37 weeks). The conception product is usually smaller -2400g. WHO also admitted a very low weight in definition, but imposed other criteria. Usually the product of conception is immature, incompletely developed and adapts with difficulty to extra uterine life. Prematurity in Romania is around 10%, all over the world it varies between 4% in Belgium and 24% in Pakistan. The premature fetus requires special care at birth and during the postpartum period. The risk of death is higher than in a full-term newborn [1-3]. Prematurity is an obstetric entity with complex medical, socio-economic, ethical and emotional consequences [4-6]. Mortality and morbidity rates increase proportionally with the decrease of the gestational age. The birth of a premature child is a critical event in family life. More than 30% of mothers have depressive symptoms, therefore a psychological preparation of the mother is required. The etiology of premature birth is complex and multifactorial [7-9].

There are Described:

Maternal factors, namely the pregnant woman pre-existing conditions, high blood pressure, nutritional diseases, infectious diseases, genetic diseases, hematological, digestive, endocrine diseases, uterine diseases, obesity. Placental factors, namely placental insufficiency, premature rupture of membranes, chorioamnionitis, placenta previa, placental abruption. Fetal factors, such as fetal malformations, hypertrophic babies, twin babies. Socio-economic factors, namely poor nutrition of the pregnant woman, poor hygiene, alcohol use, drugs, smoking during pregnancy. Occupational factors, such as intense physical effort, prolonged stress, lifting/carrying weights exceeding the physiological limit allowed. Prevention of premature birth requires knowing the etiological factors and initiating measures that reduce risk factors. Thus, in addition to the medical treatments of maternal diseases, special attention must be paid to the diet of the pregnant woman, avoiding intense physical effort or stress. The pregnant woman must undergo prenatal consultations and follow the given indications (cervical cerclage, tocolytic treatments, actinotherapy may be needed). Doppler ultrasound and biological laboratory tests are required in dynamics.

Methodology

The study refers to the possible involvement of some maternal and fetal factors in premature birth and premature mortality over a period of 5 years within the Obstetrics-Gynecology Clinic of Craiova (total 441) There were studied: gestational age, parity and health state of the pregnant woman, profession, prenatal check-ups, duration of labor, state of the amniotic membranes at admission, obstetric history, fetal weight, presentation, type of birth, number of hospitalization days (Tables 1-4).

Total number of births	1100
Prematurity index	9%
Premature stillbirths	13%
Total stillbirths	98
Premature babies born from twin pregnancies	49
1st degree Prematurity	883 – 75%
2nd degree Prematurity	182 – 16%
3rd degree Prematurity	44 – 4.01%
Premature babies born in cranial presentation	896 - 81%
Premature babies born in pelvic presentation	66 – 5.9%
Premature babies born in transverse presentation	14 – 1.3%

Table 1: Premature births.

Women under the age of 20 who gave birth prematurely	256 – 23%
Multiparous mothers who gave birth prematurely	277 – 25%
Premature births with ruptured membranes under 6 hours	193 – 17.5%
Premature births with ruptured membranes over 6 hours	104 – 9.4%
Women who gave birth prematurely and who have a history of premature births	104 – 9.4%

Table 2: Premature births.

Premature babies who died in the first 28 days after birth	42
- of which those born by forceps	2 – 4.7%
- through other obstetric maneuvers	6 – 14.4%
Premature babies who had a circular cord and died in the first 28 days after birth	9 – 21.4%
1st degree premature babies who died in the first 28 of days after birth	23 – 54.8%
2nd degree premature babies who died in the first 28 days after birth	11 – 26.2%
3rd degree premature babies who died in the first 28 days after birth	8 – 19%
Premature babies born by married women over 20 years old	71.7% - 80%
Premature babies born by women from rural areas	34.32%
Premature babies born by women who had previous abortions	2.8%
Premature babies who died in the first 7 days after birth	19 – 45.2%
Premature babies who died more than 7 days after birth	17 – 40.4%

Table 3: Gestational age.

Pregnant women with pre-existing diseases associated with pregnancy who gave birth prematurely	20%
Stressful occupational factors of pregnant women who were born prematurely	21%
Occupational and stressful factors on the body, namely excessive physical work in the rural area	15%

Table 4: Percentage of born prematurely.

Results and Discussion

Occupational (Stressful) Factors

Stress showed that pregnant women exposed to psychological stress respond differently depending on the age of the pregnancy. The stress response progresses with gestational age [10,11] The newborn of mothers with high anxiety had a significantly lower birth weight than that of a mother with a low level of anxiety. The effect of stress on the maternal endocrine system was highlighted by the increase of ACTH and Cortisone, respectively, with negative implications on the hormonal balance and catecholamine in the mother and the fetus. Occupational stress (psychic and psycho-social overload) [12] showed that women in recent years have professional activities and positions that are associated with psycho-social stress and it is well known the favorable influence of removing pregnant women with a threat of premature birth from the professional environment.

It was also demonstrated the influence of insufficient nutrition as a stress factor, as well as smoking [11]. In a study from" Biological Psychiatry", researchers Alexandra Lautarescu and Serena Counsell showed that there is a link to an interrupted development of a white matter tract, the uncinate fasculus, in the case of babies whose mothers went through more stress during the prenatal period." We discovered that in the case of mothers who were more stressed during pregnancy and in the period before birth, the white matter was altered in the babies", said Alexandra Lautarescu. There is evidence to suggest that when mothers have poor mental health during pregnancy this can lead to adverse obstetric outcomes for the baby (lower birth weight or preterm birth), but could also lead to altered early behaviours, such as crying more frequently [24].

Chorioamniotic Infection and Premature Birth

A large number of preterm births with intact membranes are due to chorioamniotic infection. The way germs enter the chorioamniotic structures can be hematogenous or ascending through the amniotic membranes.

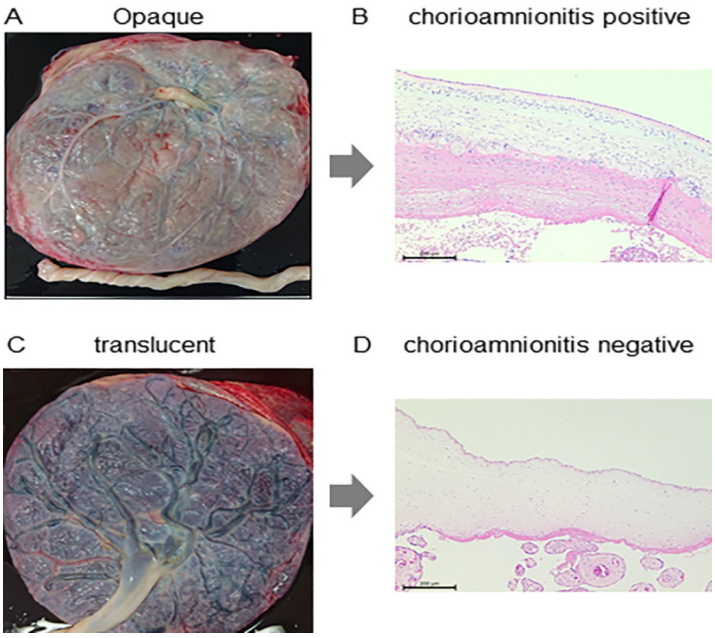

Figure 1: [25] Gross Appearance (A, C) and Histological Chorioamnionitis (B, D) of Opaque (A, B) and Translucent (C, D) Fetalmembranes. Black bars indicate 100 μm

Triggered chorioamniotitis can have an acute onset, often with faded symptoms, but with chorioamniotic damage and premature birth. The germs and their toxins arrive via the hematogenous route from sometimes-neglected sources (gingivitis, urinary infections) or penetrate through intact fetal membranes. Thus, if the membranes are broken, interleukins and prostaglandins are synthesized in the chorioamniotic structures, which lead to uterine contractions and premature birth.

The prescription of antibiotics should not be systematic. Their recommendation must be made depending on the causative germs of the infection, its sensitivity, as well as the obstetric history of the patient [19]. Isthmus-cervical failure often requires cervical cerclage and tocolytic treatment.

Socio-Economic Factors

The correlation between premature birth and poor socio-economic conditions is certain. The low socio-economic level is found in 50% of premature births. Low educational level, lack of individual hygiene, low family income, food shortages, increased physical effort, night work, can favor the onset of some disorders in the normal progression of pregnancy. The incidence of prematurity decreases constantly with advancing age of the mother, the highest incidence is found in mothers under 15 years old [17, 16].

Smoking

It is associated with premature birth. The increase in the level of circulating carboxyhemoglobin causes a decrease in the release of oxygen to the placenta with the alteration of the placental function. Smoking has harmful effects on the vascularization of the placenta, such as: vasoconstriction of the placental vessels.

Chronic Maternal Diseases

High blood pressure, heart disease, chronic kidney disease, liver disease, diabetes, as well as pregnancy-specific conditions (dysgravidies) are causes of premature birth. Most of these diseases cause a chronic alteration of placental function with a decrease in oxygen transport capacity and/or a decrease in utero-placental blood flow. Pre-existing high blood pressure or occurring during pregnancy causes premature birth and fetal hypotrophy [19,20]. Urinary infections, intraamniotic infections, placental insertion anomaly, placental hemorrhage, lead to premature birth and fetal hypotrophy. Fetal malformations are an important cause of premature birth.

Twin Pregnancy

The mean age of premature birth increases to 35 weeks for twins. The main triggering mechanism is mainly represented by the excessive increase in uterine volume.

Birth in Teenagers

Adolescent girls constitute a socio-economically disadvantaged group compared to adult women, most of them being unmarried, with a low level of education, unemployed and economically dependent on their parents, with incorrectly managed pregnancies and the incidence of premature birth is higher than in adult women (20% compared to 10%), while the fetus has a lower birth weight [19-21].

Conclusions

- Prematurity within the territory of the County Emergency Hospital of Craiova is 9.09%
- Pregnant women under the age of 20, multiparous women with a history of abortions and premature births, with their own diseases or associated with the pregnancy, with twin pregnancies, more frequently give birth to premature babies
- The condition of premature babies at birth is not consistent with their subsequent progression, many premature babies with apparently good condition at birth requiring longer hospitalization and presenting difficulties in recovery.
- More than 67% of dead premature babies had fetal distress at birth.
- The survival rate of premature infants is directly proportional to the gestational age (26-29 weeks 80%, at 37 weeks 98%)
- 24.6% of premature babies who died after birth came from mothers with conditions of their own or associated with pregnancy
- The intensively used tocolytic medication in recent years did not change substantially the percentage of prematurity
- Twin pregnancy has a high risk of premature birth, the risk increases for the second child, if the birth takes place vaginally. Cesarean section improves the prognosis of the second fetus.
- Socio-economic factors (food, smoking) have a major influence and cause premature birth.
- Occupational factors with physical stress on the body increase the risk of premature birth.
- Chorioamniotitis develops, most of the time with mild symptoms and signs, but it affects the chorioamniotic structures with the determination of protostaglandin increase, which causes uterine contractions and premature birth.

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