

The relationship between blood groups and some diseases that accompany women during pregnancy.Adel Al-Ajtal¹, Yasmine Faraj Abu Shaala², Amal Asweb³.Chemistry Department-Faculty of Science- Misrata¹, Medical laboratory specialist, Al-Aswak Health Center², Chemistry Department of the Technology Sciences faculty³.alajtal6@yahoo.co.uk¹, jasamen84@gmail.com², amalswyb@gmail.com³.

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Abstract

Diabetes is a chronic disease resulting from a disorder in metabolism and it has two types, the first type depends on insulin in their treatment, the second type depends on tablets, and the third type is gestational diabetes, and the diagnosis depends on the glucose tolerance test in the second trimester of pregnancy, and if effective measures are not taken for occupation in the early stage The severe effects will harm the health of the mother and increase various risks such as pregnancy poisoning, fetal death, fetal orgasm, gigantism and dystocia. The study was conducted in (Misrata Medical Centre, Misrata diabetes centre) The study covered cases from October 10, 2022, to January 10, 2023, that were often seen at the centres listed. Notably, the sample was chosen at random. Personal information was gathered with the patient's permission, including the patient's age, blood type, thyroid condition, and history of abortion. There were 163 cases collected, with ages ranging from 17 to 52 years. Diabetes cases occurred during pregnancy, particularly in the age range of 17 to 45 years, and the percentage of thyroid infection after pregnancy, there was also a correlation between blood type and gestational diabetes for most blood groups except O. We come to the view that blood type has a significant role in the early detection of diseases during pregnancy, particularly diabetes.

key words: Blood groups, some diseases that accompany women, during pregnancy.

Introduction

Diabetes is a chronic disease resulting from a disorder in metabolism and it has two types, the first type depends on insulin in their treatment, the second type depends on tablets, and the third type is gestational diabetes, and the diagnosis depends on the glucose tolerance test in the second trimester of pregnancy, and if effective measures are not taken for occupation in the early stage, the extreme consequences will be detrimental to the mother's health and raise risks for a number of conditions, including pregnancy poisoning, fetal death, fetal orgasm, gigantism, and dystocia [1, 2].

Women with gestational diabetes are more likely to develop diabetes in the first decade of life, and as obesity continues to spread, the incidence is increasing among women of childbearing age. Therefore, early monitoring of diabetes is of importance to the health of the mother and child, and gestational diabetes is one of the most common disorders that lead to Complication of pregnancy occurs in up to 14% of all pregnancies and is likely to be attributed to the high rate of obesity.

Excessive caloric intake and sedentary lifestyles are major factors for obesity. All pregnancies are associated with increased insulin resistance and increased pancreatic insulin secretion, as pregnancy progresses, skeletal muscles the great bone is the main site for the body to get rid of glucose and becomes insulin resistant during pregnancy. Insulin resistance begins in the middle of pregnancy and continues until the end of pregnancy, pregnancy is also associated with a 200-250% increase in insulin secretion to maintain blood sugar levels in the mother. These metabolic changes are normal and adequate nutrition is provided. The fetus and when maternal insulin secretion is unable to meet the increased demand secondary to the observed resistance, the mother is more susceptible to gestational diabetes[2].

Diabetes is also a major cause of maternal and neonatal morbidity and mortality, and it is gradually increasing due to the increase in age and obesity in pregnant women, as it constitutes about 10-15% in all pregnancies [3], if suggested that the ABO blood group system is important in determining the type of disease and that the O

blood group is more susceptible to cholera as well as oral candidiasis [4].

ABO blood group antigens are highly regarded by a large number of human cells and tissues in platelets, vascular endothelium, and neurons, and a number of researchers have addressed whether the biological property of the blood group system has clinical importance beyond existing ones such as blood transfusion and organ transplantation. In fact, there is now a group there is a large body of evidence to support the idea that antigens cause various systemic symptoms, including neoplastic, infectious, and cardiovascular, but the full pathogenic mechanisms behind other blood group-related disorders remain largely undiscovered. In addition, a number of studies have investigated the association between Maternal blood group and pregnancy complications including preeclampsia and related disorders e.g. pre-eclampsia, haemolysis, elevated liver enzymes, low platelet count, fetal growth retardation, postpartum haemorrhage, gestational diabetes[5].

Several studies reported, including a study in Turkey that linked the relationship between blood group AB and the risk of gestational diabetes ,6] [7, and study conducted in Thailand, there was no relationship between blood type and gestational diabetes[8] .

It is believed that the cumulative effects of the mother and the placenta lead to abnormalities in the insulin pathways, which leads to a decrease in glucose and an increase in insulin resistance. The exact molecular effects of such changes remain unclear[9], pregnancy also has a physiological effect on the thyroid gland and the metabolic function to meet the increasing demands during pregnancy, the size of the thyroid gland increases up to 40%, accompanied by the production of thyroid hormones, Abnormalities of its function are common among pregnant women and have been linked to many birth complications, including premature birth and pregnancy loss. As well as negative health outcomes in the offspring[2] .

Given the role played by the gland during pregnancy in glucose metabolism and balance, it has been suggested that poor secretion of the gland is one of the causes of diabetes. Approximately 10% of the general population and at least 2-3% of pregnant women suffer from autoimmune thyroid diseases [10], the thyroid receptor antibody is one of the important antibodies detected in patients with autoimmune thyroid disease[11] .

TPO thyroid peroxidase is an enzyme involved in the synthesis of thyroid hormone, the presence of autoantibodies against the TPO Ab developing secondary response are indicators of auto thyroiditis and can be detected in 10-20% of women of childbearing age [12, 13], it is widely known that adverse perinatal outcomes are associated with certain pregnancy complications, including miscarriage [14].

In addition, women who suffer from recurrent fetal loss, infertility, or miscarriage are more likely to develop thyroid antibodies compared to women who did not have positive thyroid antibodies [15], has been proven that the presence of thyroid antibodies is due to changes in the mother's immune system, It is one of the causes of miscarriage and premature birth [16], Therefore, the current study included the extent of the association between blood group and diseases associated with pregnant women, such as diabetes, thyroid problems, and the incidence of miscarriage.

Materials and methods

After the approval of the ethical committee of the centres targeted in the study (Misrata Medical Centre, Misrata diabetes centre) for cases frequented by the outpatient clinic and accommodation for women who were exposed to diabetes during pregnancy, before or after pregnancy, and those who had a problem in the thyroid gland and those who were exposed for abortion.

Data collection

The study was conducted in (Misrata Medical Centre, Misrata diabetes centre) The study covered cases from October 10, 2022, to January 10, 2023, that were often seen at the centres listed. Notably, the sample was chosen at random. Personal information was gathered with the patient's permission, including the patient's age, blood type, thyroid condition, and history of abortion.

Results and discussion

During the targeted time period in the study, 163 sick cases were collected, frequenting the aforementioned centres, where the ages ranged from 17 to 52 years, where most of the cases were from the age groups 28 to 45 years, and this is similar to a study in Nigeria[4] as figure (1).

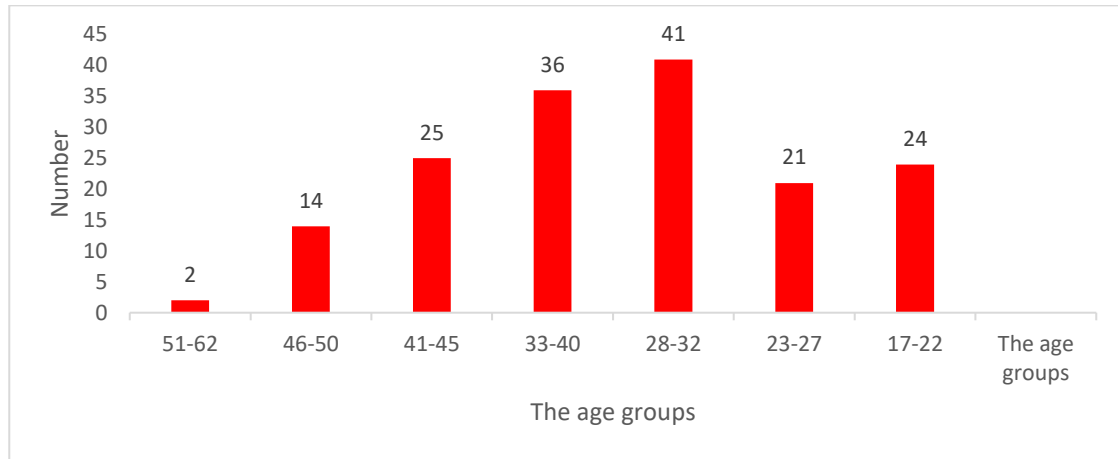


Figure (1): The age groups of the study cases.

And by studying the relationship between the age groups and the periods of diabetes, we found that most of the cases were exposed to the disease

during pregnancy and from the age groups from 17 to 45 years, while more that in the age group 28 to 33 reached 83%, show as the figure (2).

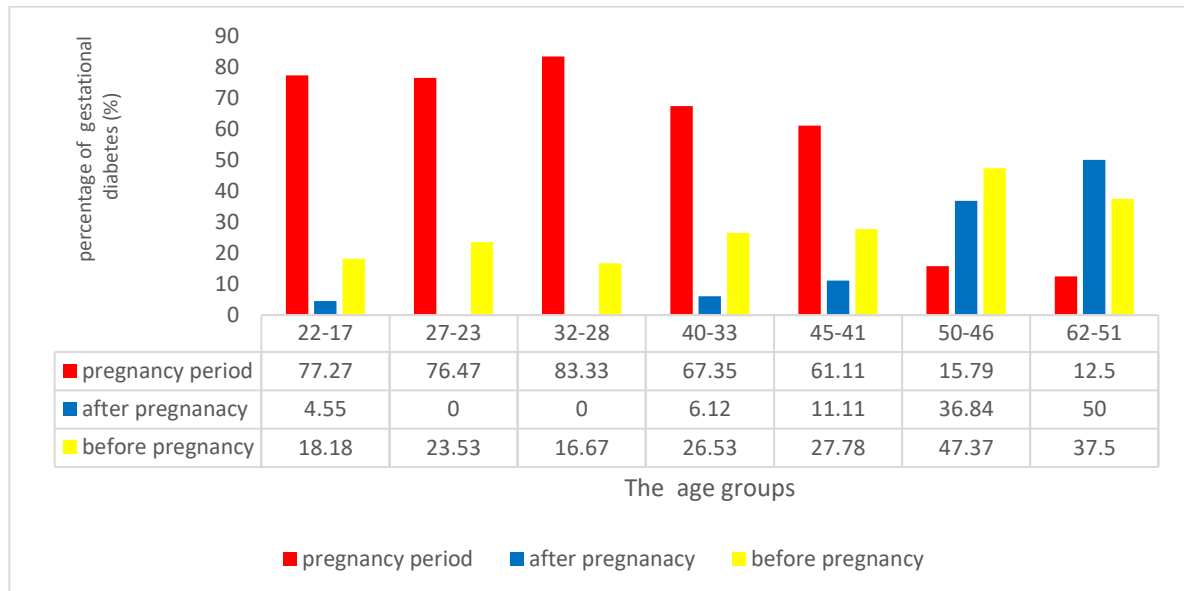


Figure (2): The relationship between age groups and gestational diabetes.

Among the results obtained from the current study, there are some cases suffering from thyroid problems, especially hypothyroidism for ages after 40 years, as it was observed that they are prone to

miscarriage, and this is similar to a study in Iran, which linked the thyroid problem to the occurrence of abortion [17] as figure(3).

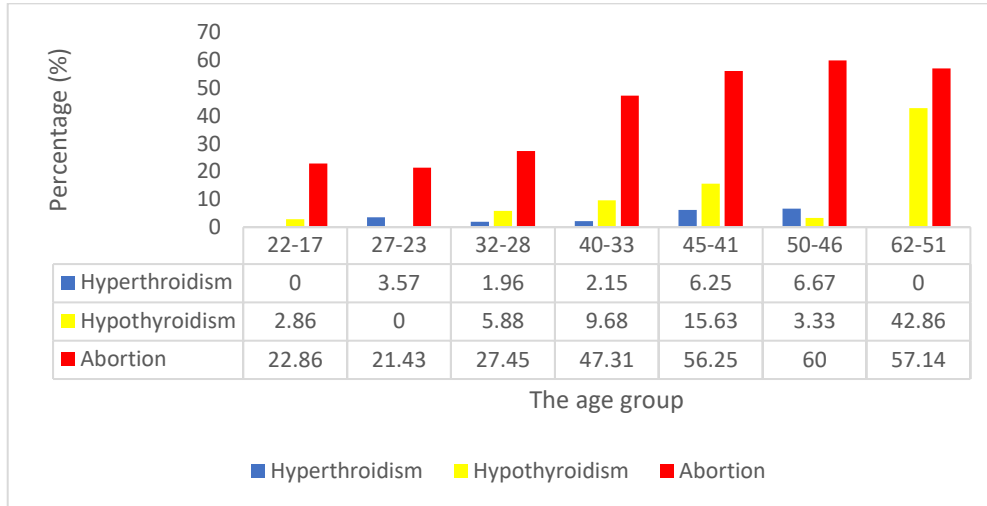


Figure (3): Association between age groups and hypothyroidism with abortion.

While when studying the relationship between the period of diabetes and hypothyroidism, a relationship was observed, especially in the period

after pregnancy, and this is similar to the two studies[18, 19] as figure(4).

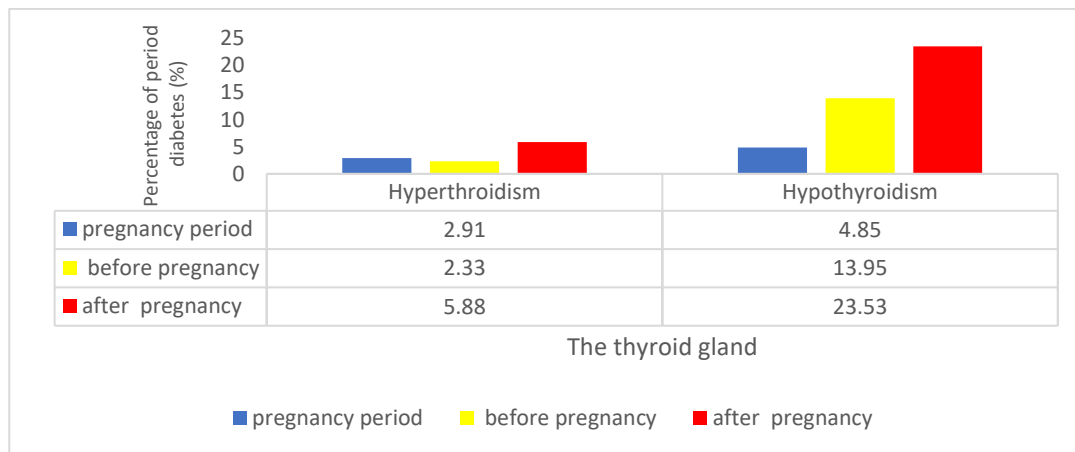


Figure (4): The relationship between the period of diabetes and the thyroid gland.

In Figure (5), we find that the positive blood groups are more present among the cases, as we found that one blood group O positive 46 cases,

while two groups A, B positive 36 cases, while the number varied between the rest of the other groups.

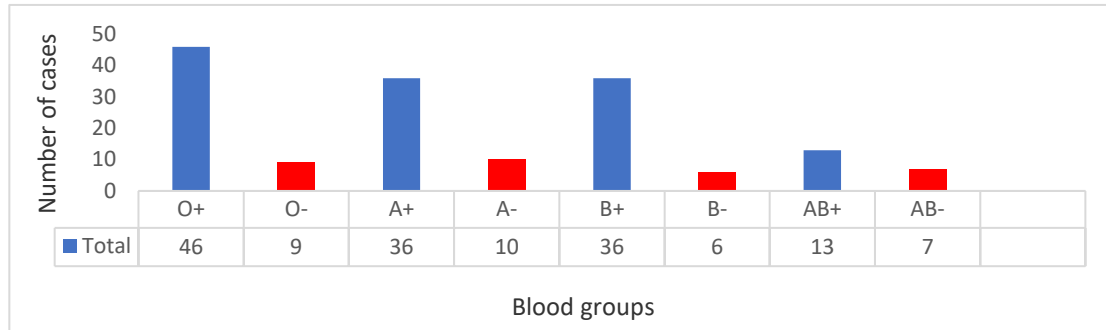


Figure (5): Blood groups.

Figure (6), which represents the most susceptible species to diabetes during pregnancy, we find from the current study that most of the species are susceptible to diabetes, especially A,AB while the blood group O is less susceptible reaching 50%. This is not comparable to the study which found.

that most of the infections were from carriers A,O[4], while the study which found that most of the infections were from carriers O,AB[20], In two studies, there was no relationship between diabetes and blood groups[21, 22] .

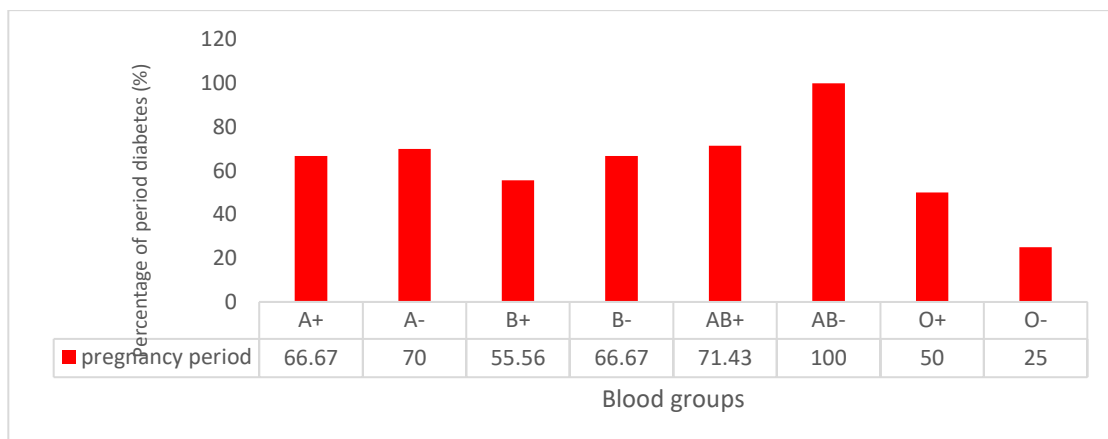


Figure (6): The relationship between the period of diabetes and blood groups.

Conclusion

We draw the conclusion that blood type plays a significant role in identifying diseases that affect women, particularly during pregnancy, and that thyroid problems serves as a signal to the attending physician of the possibility of miscarriage, especially when considering older women.

Acknowledgement

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References

- .1 Kessous, R., et al., *An association between gestational diabetes mellitus and long-term maternal cardiovascular morbidity*. 2013. **99**(15): p. 1118-1121.
- .2 Fouad, M.S., M.F. Ibrahim, and Y.M.J.T.E.J.o.H.M. Youssef, *Free Thyroxine in Early Pregnancy and Risk of Developing Gestational Diabetes*. 2018. **73**(8): p. 7288-7292.
- .3 Şahin, M.E., İ.J.J.o.S. ÇÖL, and Medicine, *Evaluation of the prevalence of gestational diabetes mellitus in Kayseri city hospital: A cross-sectional study*. 2019. **3**(10): p. 715-717.
- .4 Okon, U., et al., *The relative incidence of diabetes mellitus in ABO/Rhesus blood groups in South-Eastern Nigeria*. 2008. **23**(2-1)
- .5 Franchini, M., C. Mengoli, and G.J.B.T. Lippi, *Relationship between ABO blood group and pregnancy complications: a systematic literature analysis*. 2016. **14**(5): p. 441.
- .6 Shimodaira, M., et al., *The association of maternal ABO blood group with gestational diabetes mellitus in Japanese pregnant women*. 2016. **10**(2): p. S102-S105.
- .7 Karagoz, H., et al., *The role of blood groups in the development of diabetes mellitus after gestational diabetes mellitus*. 2015. **11**: p. 1613.
- .8 Phaloprakarn, C. and S.J.J.o.P. Tangjitgamol, *Maternal ABO blood group and adverse pregnancy outcomes*. 2013. **33**(2): p. 107-111.
- .9 Perkins, J.M., J.P. Dunn ,and S.M.J.C.D. Jagasia, *Perspectives in gestational diabetes mellitus: a review of screening, diagnosis, and treatment*. 2007. **25**(2): p. 57-62.
- .10 Matthews, D.C. and A.A.J.E.j.o.i.m. Syed, *The role of TSH receptor antibodies in the management of Graves ' disease*. 2011. **22**(3): p. 213-216.
- .11 Stagnaro-Green, A., et al., *Detection of at-risk pregnancy by means of highly sensitive assays for thyroid autoantibodies*. 1990. **264**(11): p. 1422-1425.
- .12 Prummel, M.F., et al., *Thyroid peroxidase autoantibodies in euthyroid subjects*. 2005. **19**(1): p. 1-15.
- .13 Balucan, F.S., S.A. Morshed, and T.F.J.J.o.t.r. Davies, *Thyroid autoantibodies in pregnancy: their role, regulation and clinical relevance*. 2013. **2013**.
- .14 Kaplan, S.J.J.o.O. and G. Investigations, *The relationship between thyroid autoantibody positivity and abnormal pregnancy outcomes and miscarriage in euthyroid patients*. 2020. **3**(1): p. 17-22.
- .15 Negro, R., et al., *Impact of levothyroxine in miscarriage and preterm delivery rates in first trimester thyroid antibody-positive women with TSH less than 2.5 mIU/L*. 2016. **101**(10): p. 3685-3690.
- .16 Thangaratinam, S., et al., *Association between thyroid autoantibodies and miscarriage and preterm birth: meta-analysis of evidence*. 2011. **342**.
- .17 Saki, F., et al., *Thyroid function in pregnancy and its influences on maternal and fetal outcomes*. 2014. **12**(4)
- .18 Rawal, S., et al., *A longitudinal study of thyroid markers across pregnancy and the risk of gestational diabetes*. 2018. **103**(7): p. 2447-2456.
- .19 Parham, M., et al., *Thyroid function in pregnant women with gestational diabetes: Is screening necessary?* 2015. **12**(1): p. 3-7.
- .20 Karagoz, H., et al., *The role of blood groups in the development of diabetes mellitus after gestational diabetes mellitus*. 2015: p. 1613-16.17
- .21 Kırlangıç, M.M. and M.E.J.P.J. Şahin, *Assessment of the roles of ABO blood types and Rh factors in gestational diabetes mellitus*. 2022. **30**(1): p. 38-42-38-42.
- .22 Koul, R.K., F. Bagdadi, and Y.J.B. Yaseen, *Association between ABO/Rhesus blood groups and Gestational diabetes in Kashmir Valley. A hospital based study*. **16**: p. 19.

العلاقة بين فصائل الدم وبعض الأمراض التي تصاحب المرأة أثناء الحمل

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الملخص

مرض السكري هو مرض مزمن ينتج عن اضطراب في التمثيل الغذائي وله نوعان ، النوع الأول يعتمد على الأنسولين في العلاج ، والنوع الثاني يعتمد على الاقراص ، والنوع الثالث هو سكري الحمل ، ويعتمد التشخيص على تحمل الجلوكوز اختبار في الثلث الثاني من الحمل ، وإذا لم يتم اتخاذ تدابير فعالة للعمل في المرحلة المبكرة، فإن الآثار الشديدة ستضر بصحة الأم وتزيد من ال مخاطر المختلفة مثل تسمم الحمل ، وموت الجنين ، والنشوة الجنسية للجنين ، والعملاقة ، وعسر الولادة. أجريت الدراسة في مركز مصراتة الطبي ، مركز مصراتة للسكري، وغطت الدراسة حالات من 10 أكتوبر 2022 إلى 10 يناير 2023 ، والتي تمت مشاهدتها غالبًا في المراكز المذكورة. والجدير بالذكر أن العينة تم اختيارها عشوائيًا. تم جمع المعلومات الشخصية بإذن من المريض ، بما في ذلك عمر المريض وفصيلة الدم وحالة الغدة الدرقية وتاريخ الإجهاض. تم جمع 163 حالة تراوحت أعمارها بين 17 و 52 عامًا. حدثت حالات مرض السكري أثناء الحمل وخاصة في الفئة العمرية من 17 إلى 45 سنة ، ونسبة الإصابة بعدوى الغدة الدرقية بعد الحمل ، كما كان هناك ارتباط بين فصيلة الدم وسكري الحمل توصلنا إلى الرأي القائل بأن فصيلة الدم لها دور كبير في الكشف المبكر عن الأمراض أثناء O. لمعظم فصائل الدم باستثناء الحمل وخاصة مرض السكري.

الكلمات المفتاحية: فصائل الدم ، بعض الأمراض التي تصاحب المرأة ، أثناء الحمل.