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Original article

Relationship Between Vitamin B12 and Spontaneous Abortion

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ABSTRACT

Background and aims. *Spontaneous abortion is the most common adverse pregnancy outcome. This study aimed to evaluate vitamin B12 levels in women with abortion and normal pregnancy, with the ultimate goal of studying their relationship to the occurrence of abortion.* ***Methods.*** *The study was a case- control study carried out on 60 pregnant women who attended and were admitted to Al-Ajailat General Hospital and Al-Ajailat Combined Clinics from May 2023 to July 2023. All patients signed an informed consent to participate in the study, including sixty cases (30 with spontaneous abortion before 20 weeks of pregnancy and 30 as control). Data for participants accepted in this study were collected using an interviewer-administered questionnaire that contained age, gestational age, history of abortion, body mass index (BMI), diet and socioeconomic status. Vitamin B12 was determined. The analysis was performed by using the statistical package for the social sciences, SPSS version 25.* ***Results.*** *The study showed that vitamin B12 was significantly decreased in patients with spontaneous abortion compared to controls (mean concentrations 250.2 vs. 297.8 pg./mL, p=0.043), respectively.* ***Conclusion.*** *In conclusion, vitamin B12 deficiency may increase the incidence of spontaneous abortion. Vitamin B12 assay should be considered in cases of spontaneous abortion.*

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INTRODUCTION

Spontaneous abortion can be defined as the loss of pregnancy before 20 weeks of gestation; in general, spontaneous abortion is referred to as a miscarriage [1]. The incidence of spontaneous abortion is up to about 20% of confirmed pregnancies [2]. Ultrasonography is helpful in the diagnosis of spontaneous abortion, but other testing may be needed if an ectopic pregnancy cannot be ruled out [3]. The risk factors for spontaneous abortion include extreme maternal age, smoking history, obesity, history of previous abortions, hypertension, and diabetes [4]. The Causes of spontaneous abortion include chromosomal abnormalities, vascular disease, hormonal problems, infection, and abnormalities of the uterus [5,6]. The most common complications of spontaneous abortion are Septic abortion, cervical laceration, hematoma, disseminated intravascular coagulation, and retained products of conception [7]. Vitamin B12 is a water-soluble vitamin; it is predominantly acquired through the intake of meat products, and thus vegans are at a very high risk of deficiency of this vitamin [8]. Vitamin B12 is naturally present in foods of animal origin, including fish, meat, poultry, eggs, and dairy products. In addition, fortified breakfast cereals and fortified nutritional yeasts are readily available sources of vitamin B12 that have high bioavailability [9]. Vitamin B12 is needed for fatty and amino acid metabolisms and DNA synthesis and also plays a significant role in the conversion of homo-cysteine to methionine, and its deficiency may be responsible for hyperhomocysteinemia and consequently for abortion [10]. Vitamin B12 deficiency can be caused by malabsorption of food and the inadequate intake of animal-source foods [11]. Vitamin B12 deficiency during pregnancy associated with an increased risk of spontaneous abortion [12]. The aim of study was to

evaluate vitamin B12 levels in women with abortion and normal pregnancy, with the ultimate goal of studying their relationship to the occurrence of abortion.

METHODS

Study design and setting

The study was a case- control study carried out on 60 pregnant women who attended and were admitted to Al-Ajailat General Hospital and Al-Ajailat Combined Clinics from May 2023 to July 2023. All patients signed an informed consent to participate in the study, including sixty cases (30 with spontaneous abortion before 20 weeks of pregnancy and 30 as control). Data for participants accepted in this study were collected using an interviewer- administered questionnaire that contained age, gestational age, history of abortion, body mass index(BMI)and diet. The inclusion criteria were as follows: 1). Singleton pregnancy; 2). 18-47 years of age; 3). No history of chronic diseases, such as diabetes, hypertension, cardiovascular diseases, and thyroid dysfunction; 4). No vaginal bleeding in the first trimester of pregnancy in the control group; and 5). No smoking during pregnancy.

Data collection procedure

Vitamin B12 was determined by the chemiluminescence technique using the device Mind ray (CL_2000i). Blood samples were collected in sterile tubes (clot activator) containing 5 ml of whole blood, and the sample was separated in a centrifuge at a speed of 4000 by a Hitachi sample cub with a normal range of vitamin B12 (211-930 pg./ml).

Statistical analysis

Statistical analysis was computerized using the Statistical Program for Social Sciences (SPSS version 25), which was used for data entry and analysis. Descriptive statistics were used, and all results are presented as frequencies, means, standard deviation, and percentages. Quantitative data were analyzed using the student T test. Categorical data were compared using the Chi-square test. For numerical data, the student T test was used. A P-value of less than or equal to 0.05 was considered statistically significant.

RESULTS

Table 1 shows the comparison between the two studied groups regarding age, shows that 6.7% of control cases aged less than 20 years, 43.3% aged 20.29 years, 43.3% aged 30-39 years and 6.7% aged 40-49 years, while 3.3% of aborted cases aged 20-29 years, 36.7% aged 20-29 years, 30.0% aged 30-39 years, and 30.0% aged 40-49 years. T test value = 1.490 with p-value = 0.055 > 0.05 which means that there is no significant difference in mean age between control and aborted cases.

Table 1. Comparison between control and abortion cases according to age group.

Age	Control Cases(n=30)		Aborted Cases(n=30)		Chi Square	P- value
	Count	%	Count	%		
Less than 20	2	6.7	1	3.3	5.682	0.128
20-29	13	43.3	11	36.7		
30-39	13	43.3	9	30.0		
40-49	2	6.7	9	30.0		
Total	30	100.0	30	100.0		
Mean±Sd	29.13±6.03		32.97±8.52		T=-1.490	0.055

Table (2) shows the comparison between the two studied groups regarding BMI level, shows that according to BMI level, 36.7% of control cases are normal, 43.3% are overweight, and 20.0% considered as obese. While 36.7% are normal, Ta36.7% are overweight, and 26.7% considered as obese. T test value = 0.236 with p-value = 0.798 > 0.05 which means that there is no significant difference in mean BMI level between control and aborted cases.

Table 2. Comparison between control and abortion cases BMI

BMI level	Control Cases (n=30)		Aborted Cases (n=30)		Chi Square	P- value
	Count	%	Count	%		
Normal	11	36.7	11	36.7	0.452	0.798
Overweight	13	43.3	11	36.7		
Obese	6	20.0	8	26.7		
Total	30	100.0	30	100.0		
Mean±Sd	26.73±4.65		27.02±5.01		T=-0.236	0.814

Table (3) shows the comparison between the two studied groups regarding socioeconomic status, shows that according to socioeconomic state, 3.3% of control cases have low socioeconomic state, 96.7% have middle socioeconomic status. While, 100.0% of aborted cases have middle socioeconomic status, Chi square test value = 1.017 with p-value = 0.313 > 0.05 which means that there is no significant difference between control and aborted cases in terms of socioeconomic status.

Table 3. Comparison between control and abortion cases according to socioeconomic status

Socioeconomic status	Control Cases(n=30)		Aborted Cases(n=30)		Chi Square	P- value
	Count	%	Count	%		
Low	1	3.3	-	-	1.017	0.313
Middle	29	96.7	30	100.0		
Total	30	100.0	30	100.0		

Table (4) shows the comparison in between the two studied groups regarding diet depend on animal source, shows that 66.7% of control cases had diet depend on animal source, and 33.3% of control cases did not have diet depend on animal source. While 30.0% of aborted cases had diet depend on animal source, and 70.0% of aborted cases did not have diet depend on animal source. Chi square test value = 8.076 with p-value = 0.000< 0.05 which means that there is significant difference between control and aborted cases in terms of having diet depend on animal source.

Table 4. Comparison between control and abortion cases according to diet depend on animal source

Diet depends on animal source	Control Cases(n=30)		Aborted Cases(n=30)		Chi Square	P- value
	Count	%	Count	%		
Yes	20	66.7	9	30.0	8.076	**0.004***
No	10	33.3	21	70.0		
Total	30	100.0	30	100.0		

Table (5) shows the comparison in between the two studied groups regarding vitamin b12, shows that T test value = 2.068 with p-value = 0.043 < 0.05 which means that there is significant difference in mean Vitamin B12between control and aborted cases. Control cases has Higher Vitamin B12 more than aborted cases.

Table 5. Comparison between control and abortion cases according to Vitamin B12 level

Group	N	Mean	Standard Deviation	T test	P-value
Control Cases(n=30)	30	297.80	86.104	2.068	**0.043***
Aborted Cases(n=30)	30	250.20	92.103		

DISCUSSION

Spontaneous abortion can be defined as the loss of pregnancy before 20 weeks of gestation [1]. The risk factors for spontaneous abortion include extreme maternal age, smoking history, obesity, history of previous abortion, hypertension, and diabetes [4]. The results of this study indicate that there is no statistical difference between aborted cases and control cases regarding the age of the patients. The mean age of the aborted group was higher than in the control group. The result was in agreement with Zakira et al., in which the mean age of the aborted group was 31 years and the mean age of the control group was 28 years [13]. In fact, the risk of miscarriage was lowest among women aged 25-29(9.8%), with the absolute lowest risk at age 27(9.5%), and the highest risk at age 45 and over (53. 6%). The youngest mothers (<20years) had a risk of 15.8% [14]. Regarding body mass index, the present study showed no significant differences between the two groups. The result of this study is in agreement with a previous study by Zakira et al., which showed no significant relationship between body mass index and spontaneous abortion [13]. However, these results were contradictory with Metwally et al.'s results, which stated a relationship between body mass index and the occurrence of spontaneous abortion [15]. Regarding socioeconomic, the present study showed that there is no significant difference between control and aborted cases. This result can be attributed to the fact that most people in AL-Ajailat city are of middle socioeconomic status and the small number of study groups included in this study. In contrast to such findings, previous studies indicated that women with low socioeconomic status had a higher risk of spontaneous abortion [16]. Regarding diet, it depends on the animal source, the present study showed that there is a significant difference between study groups (P=0.004). In the majority of control cases, their diet depends on animal sources, while in the majority of aborted cases, their diet does not depend on animal sources as the source of vitamin B12 is an animal food [17]. The present study showed that the control cases had significantly higher serum vitamin B12 levels than the aborted cases, with a mean serum vitamin B12 level of 297.8 pg./l for control cases and 250.2 pg./l for aborted cases (P= 0.043). This goes in agreement with the study of Marie et al., who conducted their study on 110 consecutive women with early recurrent abortion and on 96 women with one or more children and no history of abortion and concluded that vitamin B12 deficiency may be involved in women with spontaneous abortion [18]. A similar result was obtained by Abd-Ellatef et al., who carried out a study on 80 pregnant women (60 with spontaneous abortion before 20 weeks of pregnancy and 20 as control), and they concluded that reduced serum vitamin B12 was considered a risk for spontaneous abortion (P=0.0001) [19].

CONCLUSION

Our finding illustrated that the vitamin B12 level in patients with abortion is lower than the vitamin B12 level in the control group. Consequently, testing for vitamin B12 level and pre -conceptional supplementation with vitamin B12 might be beneficial to improving pregnancy outcomes, although further studies on a larger number of patients are necessary to investigate the role of vitamin B12 deficiency in spontaneous abortion.

Limitation

The following limitations should have to be considered for interpretation: The small number of study groups included in this study and the unavailability of the equipment and devices required for research in the laboratories of the collage forced us to get help from private laboratories.

Conflict of Interest

There are no financial, personal, or professional conflicts of interest to declare.

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العلاقة بين فيتامين ب 12 والإجهاض التلقائي

سعاد سالم

قسم التغذية العلاجية كلية العلوم الصحية جامعة الزاوية العجيلات ليبيا

المستخلص

الخلفية والأهداف. الإجهاض التلقائي هو نتيجة الحمل الضارة الأكثر شيوعًا. هدفت هذه الدراسة إلى تقييم مستويات فيتامين ب12 لدى النساء المصابات بالإجهاض والحمل الطبيعي، بهدف نهائي هو دراسة علاقتها بحدوث الإجهاض.

طُرق الدراسة. كانت الدراسة عبارة عن دراسة حالة مقارنة أجريت على 60 امرأة حامل حضرن وتم إدخالهن إلى مستشفى العجيلات العام وعيادات العجيلات المشتركة في الفترة من مايو 2023 إلى يوليو 2023. وقع جميع المرضى على موافقة مستنيرة للمشاركة في الدراسة، منها ستون حالة (30 حالة إجهاض عفوي قبل الأسبوع العشرين من الحمل و30 حالة سيطرة). تم جمع بيانات المشاركين المقبولين في هذه الدراسة باستخدام استبيان يديره القائمون على المقابلة والذي يحتوي على العمر وعمر الحمل وتاريخ الإجهاض ومؤشر كتلة الجسم (BMI) والنظام الغذائي والحالة الاجتماعية والاقتصادية. تم تحديد فيتامين ب12. تم إجراء التحليل باستخدام الحزمة الإحصائية للعلوم الاجتماعية الإصدار 25 SPSS.

النتائج. أظهرت الدراسة أن فيتامين ب 12 انخفض بشكل ملحوظ في المرضى الذين يعانون من الإجهاض التلقائي مقارنة بالضوابط) متوسط التركيزات 250.2 مقابل 297.8 بيكوغرام/مل، (p=0.043، على التوالي.

الخاتمة. في الختام، نقص فيتامين ب 12 قد يزيد من حدوث الإجهاض التلقائي. ينبغي أخذ فحص فيتامين ب12 بعين الاعتبار في حالات الإجهاض التلقائي.

الكلمات الدالة. فيتامين ب12 الإجهاض التلقائي ، الحمل الطبيعي.