

ORIGINAL ARTICLE

Prevalence of Group B Streptococcus at 24-34 Weeks of Gestation, with Symptoms of Preterm Labour with and without Rupture of Membrane: A Case-Control Study

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ABSTRACT

Aim: The aim of this study was to determine the prevalence of the Group B Streptococcus in 24 to 34-week pregnant women, with premature labor symptoms with and without the rupture of the amniotic sac.

Study design: A case-control study

Place and Duration: This study was conducted at Gynaecology and Obstetrics Unit at Dow University Hospital Karachi Pakistan from June 2020 to June 2021.

Methodology: All of the 60 women were 24 to 34 weeks pregnant and had premature labor symptoms. The women were divided into 2 groups based on whether the amniotic sac was intact or not. The Control group contained women with intact membranes and the case group contained women with ruptured membranes. From all the participants, Group B Streptococcus samples were collected from the vagina at the start of the study. These samples were then cultured. The demographic data and cultural information of all the women were compared in 2 groups. SPSS, chi-square test and t-test were used to analyze the data. A P-value less than 0.05 was considered significant.

Results: Both the groups showed no significant difference in maternal age with a p-value equal to 0.259, gestational age with a p-value equal to 0.725, gravidity with a p-value equal to 0.536, and history of previous premature deliveries with a p-value equal to 0.926. A total of 10 percent of the women with ruptured amniotic sacs resulted in positive Group B Streptococcus culture. On the other hand, 4 percent of the women with intact amniotic sacs resulted in positive Group B Streptococcus culture. The overall occurrence of Group B Streptococcus was almost 7 percent.

Conclusion: The prevalence of Group B Streptococcus was more in pregnant women with ruptured membrane/ amniotic sac than in pregnant women without ruptured membrane.

Keywords: Group B Streptococcus, premature labor, ruptured membrane, intact membrane, amniotic sac, culture test

INTRODUCTION

Premature birth is a health problem found in both developed and underdeveloped countries. This problem leads to many other health issues and complications in newborns. Many of these complications are long-term morbidities i.e. chronic lung diseases, spinal cord paralysis, and defects and delays in neurological development^{1, 2}. Many circumstances can lead to premature birth. Almost 40 % of the women with intact membranes undergo premature labor without any known cause. Various studies are being carried out to explain the cause of spontaneous premature labor in women with intact amniotic sacs. According to a hypothesis, infections can cause premature labor^{3, 4}.

The presence of some bacteria i.e. Urea plasma, B streptococci, and Mycoplasma, can cause premature delivery⁵. Group B Streptococcus contain Lancefield Group B carbohydrate (GBC) as its antigen. One of the species containing this antigen is called *S. agalactiae*. This species of streptococcus can reside in the gastrointestinal tract (GIT) and genital tract of women. It is reported that almost 40 % of pregnant women are inhabited by this bacteria. The infected women are mostly asymptomatic but sometimes this bacteria can cause symptoms such as

chorioamnionitis, urinary tract infections (UTI), and endometritis. This bacteria can easily infect the infant of infected pregnant women. Almost 70 % of the newborns of infected mothers are infected by the same bacteria⁵. Group B Streptococcus (GBS) is found in the rectum and vagina of almost 25 % of adult women and does not cause any harm. But when the bacteria causes a positive culture test and has colonized the body of pregnant women, it can transfer to the baby during parturition. The occurrence of group B Streptococcus in pregnant women is 20 to 30 % and mostly asymptomatic⁶.

Group B Streptococcus affects one out of every 2 thousand infants. Even though the prevalence of group B Streptococcus is rare in pregnant women, the case of infection can be severe and dangerous. That's why it is important to get routine check-ups during gestation period⁷. Also, a screening test for group B Streptococcus should be performed for all pregnant women. It is reported that the test performed after 5 weeks of parturition has maximum accuracy in determining the infection in infants⁵.

For every 200 infants, who receive group B Streptococcus from their carrier mother, if signs and symptoms of group B Streptococcus infection appear then the mother should get antibiotic treatment during childbirth.

For such infants, complete evaluation for the diagnosis should be done ⁶. The treatment should be continued till the culture test comes out negative ⁸. Due to the adverse effects of group B Streptococcus infection, swab tests should be done commonly.

The aim of this study was to determine the prevalence of the Group B Streptococcus in 24 to 34-week pregnant women, with premature labor symptoms with and without the rupture of the amniotic sac.

METHODOLOGY

This study was conducted at Gynaecology and Obstetrics Unit at Dow University Hospital Karachi Pakistan from June 2020 to June 2021. This was a case-control study, which included 60 pregnant women. All the women were 24 to 34 weeks pregnant and had premature labor symptoms. The women were divided into 2 groups based on whether the amniotic sac was intact or not. The Control group contained women with intact membranes and the case group contained women with ruptured membranes.

Pregnant women taking antibiotics within the past week, with a history of a specific disease, having chorioamnionitis membrane separation symptoms, having uterine tenderness, maternal tachycardia (heart rate over 100 bpm), fetal tachycardia (heart rate over 160 bpm), fever (temperature above 38 degrees), foul-smelling amniotic fluid, and vaginal bleeding were excluded from the study.

From all the participants, group B Streptococcus samples were collected from the vagina by swab test at the start of the study. These samples were then cultured. Culture media included thioglycolate, blood agar, chocolate agar, and strain of staphylococcus aureus. All the pregnant women included in the study were admitted to the hospital. I. 4 gram of magnesium sulfate combined with 100 ml of normal saline was administered intravenously for 20 minutes in all women. Then 2 grams of this solution was administered intravenously every hour for 12 hours. 12 mg of betamethasone was injected intramuscularly at the time of admission. This injection was in the same dose repeated after 24 hours for lung maturation of the fetus.

The demographic information of all the women and culture test results were compared into 2 groups. Data were analyzed using SPSS version 25. Descriptive statistics included: relative frequency, standard, and mean deviation. For qualitative data chi-square test was performed. For quantitative data t-test was performed. The results of both groups were compared. A P-value less than 0.05 was considered significant.

RESULTS

This study included 60 pregnant women of gestational age between 24 to 34 weeks. All the women showed symptoms of premature labor. The study was conducted in – hospital for – duration. The women were divided into 2 groups based on whether the amniotic sac was intact or not. The Control group contained women with intact membranes and the case group contained women with ruptured membranes. Each group contained 30 women.

Kolmogorov-Smirnov test was performed to check the distribution of data. Age with a p-value equal to 0.626, gravidity with a p-value equal to 0.312, and gestational age

with a p-value equal to 0.584 showed normal distribution. According to the results of the t-test, the age of the mother with a p-value equal to 0.259, gravidity with a p-value equal to 0.536, and gestational age with a p-value equal to 0.725 showed no statistically significant difference. In terms of these variables, the women in both groups were identical. This is shown in Table 1. Results of Fisher’s test showed that there was no statistically significant difference between the histories of premature labor between both the groups. This is shown in Table 2.

In the group with the ruptured membrane (case group), group B Streptococcus culture came out positive in 10 % (3 patients) of the patients. The first case was 25 years old pregnant woman, 1 parity, and 31 weeks pregnant with 2 previous pregnancies. The second case was a 30 years old pregnant woman, 1 parity, and 30 weeks pregnant with no history of premature labor. And the third case was 27 years old pregnant woman, 1 parity, and 29 weeks pregnant with 1 previous pregnancy.

In the group with the intact membrane (control group), group B Streptococcus culture came out positive in 4 % (1 patient) of the patients. The patient was 27 years old pregnant woman, parity 2 and 33 weeks of gestation age with 3 previous pregnancies. Overall, 7 percent of patients had positive group B Streptococcus culture test. This is shown in Figure 1.

Table 1: Different variables of both groups

Variables	Patients with ruptured amniotic sac (cases)	Patients with intact amniotic sac (control)	
	Mean standard deviation	Mean standard deviation	Significance level
Age	29.23 (5.70)	27.72 (4.62)	0.259
Gestational age	30.42 (3.30)	29.81 (6.53)	0.725
Gravidity	1.98 (0.89)	2.09 (0.89)	0.536

Table 2: Results of Fisher’s test

	Patients with intact amniotic sac (control)	Patients with ruptured amniotic sac (cases)
History of premature delivery	Percentage	Percentage
Yes	18	18
No	82	82
Significance level	0.926	

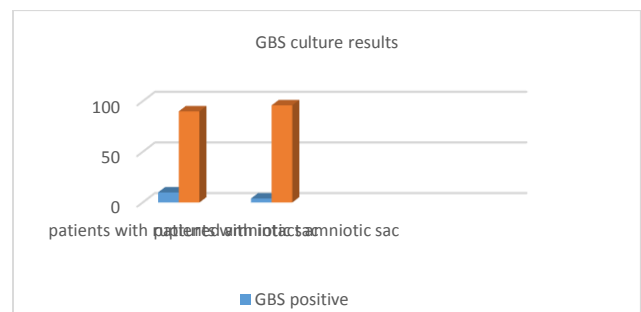


Figure 1: Group B Streptococcus culture test results of both groups

DISCUSSION

In the current study, 60 pregnant women with the gestation age of 24 to 34 weeks were divided into two different groups. The first group was the women with the amniotic sac rupture (case) and the second group with the women without any ruptured amniotic sac (control). The mean age of the pregnant women, in this study, without the membrane rupture was 28 years. On the other hand, a pregnant woman with the rupture of the membrane was 68 years. In another study, almost 403 pregnant women were examined⁹. This study also had a similar age to the current study which was 27 years⁹.

According to the study of Zilberman, women who had tested positive in group B streptococcus culture test had the age range from 21 to 32 years. Furthermore, the women with negative group B streptococcus culture test age ranged from 22 to 34 years¹⁰. This past study and the current study findings are consistent. In the study of Javanmanesh, the average age of the women was 26 years which is similar to the current study findings¹¹.

In the current study, the average gravidity in the group of women with the rupture of the membrane was 2 and on the other hand, the women without the rupture of water bag were 2.09. The common level of education present in the group of women with ruptured membranes was secondary level. Almost 65 percent of women of this group had secondary level education. The women without rupture of amniotic sac also had secondary level education. Almost 89 percent of women of this group had secondary level education. Consequently, the highest level of education in our study was the secondary level. In the study of Javanmanesh, the education level of pregnant women was evaluated. Almost 33 percent of the women with positive group B Streptococcus culture test and 34 percent with negative test had diploma education¹¹. The results of this study and our study were consistent.

In another study, almost 28 percent of the patients had diploma-level education. No significant difference between the levels of education of pregnant women was observed⁵. Moreover, there was no significant relationship between the level of literacy of individuals and their maternal age⁵.

In the current study, on the basis of chi-square test results, the frequency of premature delivery history was evaluated in the women with amniotic sac rupture and women without amniotic sac rupture. In both groups, 18 percent of women had a history of premature labor. There was no significant difference between both, with a p-value equal to 0.926.

According to the most important findings of the current study, the prevalence of group B Streptococcus was 4% in the control group and 10% in the case group. Overall, 7 percent of patients had positive group B Streptococcus culture test. Around 420 women were examined in the study of Habibzadeh, from which 14.8 % had positive group B Streptococcus¹². In another study, the incidence of positive group B Streptococcus was 5.3 %¹³. In the study of Tajik, the prevalence of group B streptococcus was evaluated in pregnant women with preterm rupture of the amniotic sac. It reported almost 14 % of the women with positive group B streptococcus culture test¹⁴.

There are several reasons involved in the difference in the prevalence of positive group B Streptococcus culture test results of Jahed's and our study; the first and the main reason is the technique used to find the microorganisms in the lab by using different culture media. The second reason includes the previous use of antibiotics. In the study of Jahed and other studies, the use of antibiotics was not included in the exclusive criteria. The current study eliminates the use of antibiotics and it is included in exclusive criteria¹³. Further research should be done on this topic for a better understanding of premature delivery. A larger sample size should be used for future studies.

CONCLUSION

This study concluded that the prevalence of Group B Streptococcus was more in pregnant women with ruptured membrane/ amniotic sac than in pregnant women without ruptured membrane.

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Permission: It was taken from the ethical review committee of the institute

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