Original Article

Frequency of *Group B Streptococcal* Colonization in Pregnant Women Aged 35- 37 Weeks in Clinical Centers of Shahed University, Tehran, Iran

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ABSTRACT

Background & Objectives: **One of the important infectious factors in pregnant mothers and newborns is Group B Streptococcus (GBS). There is no perfect report about prevalence of GBS in Iran and in the case of preterm rupture of amniotic membrane or preterm labor all patients are treated by antibiotics without culture so this has led to adverse taking antibiotics and drug resistance. The present study is intended to determine the frequency of colonization of GBS in the pregnant mother (35-37 weeks), referred to medical centers of Shahed University.**

Methods: **Overall, 210 pregnant women (35-37 weeks), referred to medical center of Shahed University, Tehran, Iran were selected as sample group and after filling out the questionnaires about demographic data and midwifery status and the related information of post- partum, the rectovaginal culture was done for them.**

Results: **Among 210 samples, 7 (3.3%) included positive culture in terms of GBS colonization while all these cases were sensitive to penicillin, ampicillin, cephalothin, nitrofurantoin, and all of the samples were resistant against tetracycline and contrimoxazole. There was no relationship among age, job, education, number of pregnancy, blood pressure background, diabetes and preterm childbirth with positive culture. Similarly, because of limited number of positive cases it was not possible to examine the relationship among GBS colonization and infection in mother and newborn.**

Conclusion: **There was a low frequency in GBS colonization in the studied hospitals and the study inside the country also confirms this finding.**

Keywords: Streptococcus Group **B, Rupture, Amniotic Membrane, Preterm Labor**

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Introduction

In 1970, Group B *Streptococcus* (GBS) was characterized as the main neonatal septic factor and main agent in infections of genital tract in mother. It is approximated that 20-30% of all pregnant women are vector for GBS. However, microbial colonization may be transient and periodic. The epidemic infections caused by GBS in newborns comprise of sepsis, pneumonia, and meningitis. The given disease occurs with preterm prevalence at first week of life and the post term disease will be expressed after first week (1). GBS infection is expressed in mother in the form of infection in urinary tract, corioamnionitis, endometriosis, bacteremia, and stillbirth (1). Similarly, GBS infection is expressed in mother in the form of infection in urinary tract, corioamnionitis, endometriosis, bacteremia, and stillbirth may cause prevalence of bacteremia, pyelonephritis, and metritis after childbirth in mother. At the same time, emergence of osteomyelitis, mastitis after childbirth caused by this organism has been reported (2). Bacteria from 2-15% have been isolated from infectious wounds after cesarean delivery (1).

Several studies have been adopted to use different diagnosis methods like Fluorescent in situ Hybridization (FISH), Latex Agglutination Test (LAT), and PCR (3-6).

Regarding treatment of infections caused by *Streptococcus group B*, penicillin is still the selective cure for prevention from *Streptococcus group B* infection and ampicillin is the next alternative.

In the case of sensitivity to penicillin, the next alternatives are clindamycin or erythromycin and if there is a resistance against these two alternatives then vancomycin is taken (1).

In newborns, penicillin is also the selective treatment and in the cases of suspicious bacterial sepsis, ampicillin and gentamicin are prescribed until preparation of culture result. If cultures show sign of GBS, many pediatricians continue prescription of gentamicin plus ampicillin or penicillin for several days namely until clinical treatment might be observed (1).

Immunization has created some hopes for prophylaxis of disease and protection against premature and post term infections. Moreover, vaccination may prevent from the consequences of unintended pregnancies along with GBS like preterm delivery, automatic abortion or stillbirth especially due to fertilization in young girls before pregnancy. Furthermore, the intervening immunization methods do not play role in prevalence of antimicrobial resistance among GBS. Some of hopeful vaccines have been produced but they are not commercially affordable (1).

In Iran, no perfect report has been presented concerning to prevalence of GBS and in the case of premature rupture of amniotic membrane or preterm labor, all patients are treated by antibiotics without the given culture so this has been led to adverse taking of antibiotics and drug resistance . Alternately, the rate of prevalence of this infection has been yet unknown without the culture.

The current survey was aimed at determination of the frequency of GBS colonization in pregnant women (35-37 weeks), who referred to medical centers of Shahed University, Tehran, Iran.

Materials and Methods

This investigation is a kind of case studies conducted in Shahid Mostafa Khomeini and Zeinab (PBUH) Hospitals in Tehran, Iran in 2010-11. The studied population included all pregnant women (35-37 weeks), without a history premature rupture of membrane at the time of study entry who referred to medical gynecological centers in the previously mentioned hospitals for prenatal control.

Sample space comprised of 210 participants. Initially, patients filled out a questionnaire regarding demographic data (age, job, and education), midwifery background, and history of suffering diseases including diabetes and

hypertension and rather than taking consent from the given patients, For culturing specimen preparations, sampling with the swab from the bottom of vagina without the need of speculum has been done and rectum specimen has been taken from anal sphincter with another swab, both specimens kept in the same environment and sent to laboratory culturing environment was 8 cm sheep blood agar (the medical equipment company mistletoe, Tehran, Iran was prepared) and the act of culturing had been done in "Shahid Mostafa Khomeini" Hospital. Specimens were cultured in linear method with wet physiologic serum and in blood agar environment in 48 to 72 hours in incubators with 37 degrees. From the very beginning, Gram coloring happened in order to indicate Gram positive coccus. Then catalase was tested, if it was negative, the Camp test was done. In this test, *Streptococcus* and *Staphylococcus* were cultured in the same environment. One obvious hemolytic scope like an arrowhead with its head going through *Staphylococcus* ruler was created, if the *Streptococcus* was group B. After diagnosis of GBS the antibiotic sensitivity was measured with disk diffusion method.

Moreover, after labor, the information regarding the age of the end of pregnancy, newborn's weight, the possibility of neonatal and mother's infection and date of amniotic sac rupture was followed up by archived file or the existing phone number in the questionnaire. SPSS- 16 software and Chi-2 test and Mann- Whitney test were adopted to conduct statistical analysis.

Results

In this study, the rate of frequency of GBS positive colonization was 7 of total 210 participants (i.e. 3.3%). In terms of age frequency, the studied samples were 41 participants (19.5%) at ages 15-24; 155 of them (73.8%) at ages 25-34, and 14 women (6.7%) at ages 35-44, respectively. The youngest woman was at 17 while the oldest one was at 40, the mean age of the sample was 27.9 ± 4.3 yr. In terms of occupation, 176 respondents (83.8%) were householders and 34 ones (16.2%) were employees and students. Based on educational status, of total 210 participants, 21 women had under- high school diploma, 101 had diploma, and 88 were upper- diploma or academic education.

No significant statistical relationship was observed among demographic status and GBS colonization.

In terms of abortion, about 25% of participants had implied that they had abortion background. No significant statistical relationship was found among number of pregnancy, labor, and abortion with GBS (Table 1, 2, 3).

Table 1- Frequency of pregnancy among in total samples

Number of Pregnancy	Frequency	Ratio (%)	Cumulative Percent
1	116	55.2	55.2
2	74	35.2	90.5
3	12	5.7	96.2
4	7	3.3	99.5
5	1	0.5	100

Table 2- Frequency of number of labor in total samples

Number of Childbirth	Frequency	Ratio (%)	Cumulative Percent
0	128	61	61
1	72	34.3	95
2	9	4.3	99.5
3	1	0.5	100

Of studied samples, 2 had background for preterm labor, 18 cases had suffered from gestational diabetes while no case was reported with hypertension therefore the statistical relation among preterm labor and diabetes and hypertension with GBS colonization via Chi-2 test does not any significant relationship (P>0.05, Table 3).

Table 3- Association between risk factors and GBS colonization

Risk factors	Pregnant women with GBS* colonization (n = 7)	Pregnant women without GBS colonization (n = 203)
Previous spontaneous abortion	0	25
Background Preterm labor	0	2
Labor in <37w	0	6
Labor in>37w	7	185
Diabetes	1	17
Sepsis	1	5

*Group B *Streptococcus* P <0.05

The frequency of age at the end of pregnancy in samples was 6 cases (2.9%) before 37 weeks and in 192 cases (91.4%) it was after 37 weeks. The lowest age at end of pregnancy was 35 weeks while the highest age at the end of pregnancy related to 42 weeks. The conducted statistical analyses on the impact of GBS colonization on age of the ending pregnancy indicates no significant relationship statistically (P>0.05, Table3).

Concerning to time of amniotic sac rupture, this time was not more than 18 hours in any of these samples while the date of amniotic sac rupture has been maximally 10 hours. As a result, we could not examine its relationship with prevalence of GBS colonization.

No case has been mentioned as fever in and infection in mother after delivery and corioamnionitis in the studied samples thus we could not examine the relationship between GBS colonization and these cases.

Number of hospitalized newborns was 28 cases (13.3%) out of which 2.8% was due infective reasons and 10% caused by non- infectious reasons. Ch-2 showed no significant relationship among GBS and neonatal hospitalization caused by infectious reasons.

Discussion

Frequency of GBS colonization in the conducted study was 7 out of total 210 participants (3.3%). Different studies have reported different rate of GBS colonization, e.g. in Kashan, Iran 5.8% (7), in Garland's survey, 12.9% (8), in south Indian, 2.3% (9), in Piper study 12% (10), In UK 14% (11), in US 20-30% (12), in India 2.3% (13), and in Saudi Arabia 31.6% (14).

With respect to these studies, the above-said statistical rates are not so high in our research and this rate is approximately close to statistical rate in Kashan University thus it could be concluded that in comparison with the reference books, the rate of bacterial colonization in Iran has lower prevalence.

In terms of the impact of demographic status including age, job, and education, no significant relationship was found among these cases with colonization of GBS.

Also in investigation done by Sarfarazi, demographic factors in terms of occupation and education has not affected on rate of GBS colonization (7). Variable of age had no impact on bacterial colonization (9). Rate of frequency of GBS colonization was higher among healthcare system employees but education had no impact on frequency of bacterial colonization (15). The

results of this study regarding education are similar to other studies but there is difference among studies in terms of occupation.

In this study, age factor had no impact on GBS colonization.

In terms of the impact of midwifery status, including number of pregnancy, number of childbirth, and abortion also no significant relationship was found among these cases with GBS colonization.

Number of abortion and delivery had also no impact on rate of bacterial colonization (7). Multi-gravid women or with previous background had higher level of positive colonization than others (13).

With respect to findings from most of the studies, the midwifery factors including number of labor, quantity of pregnancy, and abortion did not effect on GBS colonization.

In terms of the impact of diseases with background like backgrounds of preterm labor, diabetes, and hypertension impact on GBS colonization, our study did not also indicate statistically any significant relationship among these factors so this confirms the findings of studies done by Sarafarazi and Piper as well.

Like Garland's study, no significant relationship was found among GBS colonization in pregnancy period and the age of ending pregnancy in the present survey.

In this study, no case of amniotic sac rupture has been observed longer than 18 hours as a result we could not judge about the impact GBS vaginal colonization on amniotic sac premature rupture. In investigation of Garland *et al.* during the period of pregnancy, GBS was not followed by this case in premature rupture of amniotic sac (8).

In terms of the impact of GBS vaginal colonization on neonatal weights in this study, no significant data was shown statistically as well. Similarly, no study was found in this respect inside and outside of Iran.

None of the existing cases in this study was suffered from these disorders in terms of impact of GBS colonization on fever, infection, and corioamnionitis in mother so we could not examine their relation. Similarly, no research was found in this regard inside and outside of Iran.

No significant relationship was shown statistically in terms of the impact of GBS colonization on neonatal infection in this investigation. Among the newborns along mothers with positive culture in Study of Sarfarazi, 7.8% of them were suffered from sepsis caused by GBS and the role of positive vaginal colonization in creating neonatal preterm infection was confirmed (7).

Also rate of neonatal sepsis was higher in positive culture group in survey done by Piper et al (10). In paper of Schrage, mother's sepsis has been considered as the important reason for neonatal sepsis (16).

More than 36% of newborns from mothers with positive culture were infected with bacteria during childbirth and 3% of them expressed disease with premature inception (11). It was indicated that prevalence of neonatal premature streptococcus infection has been reduced by mother's antibiotic treatment during pregnancy in comparison with those, who have not received drug treatment (17).

In general, unlike the present survey, the studies done inside and outside Iran indicated the impact GBS vaginal colonization of mother on neonatal sepsis during pregnancy whereas the prevalence rate of positive cases is low in this study so this issue could not be appropriately assessed.

In terms of antibiogram, in the cases where cultures became positive, all the given samples had been sensitive to penicillin, ampicillin, cephalothin, nitrofurantoin, and ciprofloxacin and all 7 cases were resistant against tetracycline and cotrimoxazole.

GBS was found to be sensitive to the following antibiotics: cephalothin(100%), norfloxacin (96.9%), ampicillin (96%), nitrofurantoin (95.5%), and vancomycin (95%). In this study, GBS showed greatest resistance to tetracycline (81.6%) and co-trimoxazole (68.9%) (18).

None of positive cases was resistant against penicillin and clindamycin while 71.4% of positive cases were resistant against tetracycline and there was resistance against erythromycin in one case (13).

All cases remained sensitive to penicillin and ampicillin but it was seen resistance against erythromycin and clindamycin at 16.1% and 13.1% levels respectively (19). As a result, it was seen in all studies that GBS is still sensitive to penicillin and ampicillin but it shows resistance against tetracycline.

Conclusion

Since there is no an integrated approach toward diagnosis and treatment of this infection in Iran so until conducting further reviews and acquiring of more general results it is better to take an approach based on risk factors in order to prevent from maternal and neonatal disorders caused by this infection. It is recommended to carry out more studies on other diagnostic and prophylactic methods like PCR and vaccination.

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