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Outcomes of Pregnancy with Group B Streptococcal Infections in Najran, Saudi Arabia

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Abstract

Background: The gram-positive, beta-hemolytic, and chain-forming Group B Streptococcus (GBS), commonly known as *Streptococcus agalactiae*, may asymptomatically invade the human gastrointestinal and vaginal tracts. However, GBS may become very invasive and pathogenic to the mother and baby during pregnancy, having negative effects. **Study Aim:** This study aims to investigate the pregnancy outcomes of women who tested positive for genitourinary GBS infection during pregnancy in Najran, Saudi Arabia. **Methods:** Data was collected retrospectively from patient files in Armed Forces Hospital, Najran, Saudi Arabia. Data collected were entered to a Microsoft Excel sheet, then imported and analysed using the Statistical Package for Social Sciences. **Results:** The study included 272 women of whom 66.5% were 31 to 45 years old. Gestational diabetes was diagnosed in 8.5% of the sample, 71.7% had a normal spontaneous vaginal delivery (NSVD), 1.8% had previous abortions, and 27.2% of new-borns were admitted to the NICU after delivery. There was a significant association between NICU admissions and women employment status ($p = 0.001$), gravidity ($p = 0.001$), parity ($p = 0.001$), history of abortions ($p = 0.001$), medical conditions ($p = 0.049$), and mode of delivery ($p = 0.049$). **Conclusion:** According to the findings of our study, GBS infection during pregnancy is associated to more NICU admissions. NICU admissions were significantly correlated with gestational diabetes, hypertension, and hypothyroidism in mothers but not with intrapartum antibiotic use.

Keywords

Pregnancy, Group B Streptococcal, Outcomes

1. Introduction

Streptococcus agalactiae, also known as Group B Streptococcus (GBS) is a type of gram-positive bacterium that mostly inhabits the urethra, vagina, and digestive system [1]. Early neonates are particularly vulnerable to infection from GBS, which always results in septicemia, pneumonia, and meningitis and poses a substantial threat to their lives [2] [3] [4]. Newborn GBS infection exhibits a variety of patterns within and between nations. Most GBS-infected women have no symptoms, yet the bacterium can still be discovered in their rectum, vagina, and throat. In different nations, the percentage of pregnant women who have GBS infection ranges from 5% to 40% [5] [6]. Early-onset neonatal GBS infections are typically brought on by birth canal transmission or aspiration of infected amniotic fluid [7]. The prevalence of GBS infection is rising in the presence of additional predisposing factors such prematurity, maternal fever, premature rupture of membranes (PROM) lasting longer than 18 hours, low birth weight, and multiparity.

Approximately 20% - 25% of women globally have GBS infiltrate their rectovaginal area, with rates varied greatly across regions of the globe [8]. The frequency of colonisation ranged from 7% - 14% in Central America and Asia to 35% in the Caribbean, according to a meta-analysis that included estimates of GBS colonisation from 85 different countries. The prevalence percentages in Australia, Europe, and North America were all between 15% and 20%. It's interesting to note how greatly estimations differed across Africa, with West and South Africa's estimates at 14% and 25%, respectively [9]. It is difficult to ascertain whether the incidence of rectovaginal colonisation is changing over time due to the asymptomatic nature of this condition; nonetheless, there is evidence that invasive GBS infection in non-pregnant people is rising. In the Active Bacterial Core monitoring network, the incidence of invasive GBS infection rose from 8.1 to 10.8 cases per 100,000 people between 2008 and 2018, accounting for 11.5% of the US population [10]. Up to authors' knowledge, no previous literature reported the effects of GBS on pregnancy in Najran, Saudi Arabia, and stemming from the importance of this condition, our study will be the first in the region to do. This study aims to investigate the pregnancy outcomes of women who tested positive for genitourinary GBS infection during pregnancy in Najran, Saudi Arabia.

2. Participants & Methods

2.1. Study Design

This study was a retrospective study.

2.2. Study Duration

The data was retrieved during the period from March 2022 to April 2022.

2.3. Study Population

The research used information from the Armed Forces Hospital in Najran, Saudi Arabia. The sample size includes all pregnancies that were investigated and tested positive for genitourinary GBS infection in the last two years.

2.4. Data Collection Techniques

Age, employment status, parity, gravidity, gestational age at the time of testing, and pregnancy outcomes were all included in the pre-designed form used to access the data.

2.5. Data Management and Statistical Analysis

The Statistical Package for Social Sciences (SPSS) version 26 was used to import data from a Microsoft Excel sheet for further processing and analysis. Simple frequency tables were used for the descriptive analysis. We used the Chi-square test for inferential analysis where a p-value equal to or less than 0.05 was considered significant.

2.6. Ethical Considerations

The Ethical approval was obtained for this study. We did not include names or other personal identifying data.

3. Results

The total sample size was 272 included in this study. Table 1 shows characters of included sample. Age ranged from 18 to 45 years. Women who were 31 to 45 years old constituted 66.5% of the sample. Over half of the sample (64%) were not employed. Gestational diabetes was diagnosed in 8.5%, whereas hypertension and hypothyroidism were prevalence among 2.2% and 1.8%, respectively. Of all, 1.8% of women had an abortion, and 23.2% had a Caesarean section (CS). The majority of women received intrapartum antibiotics (84.9%) and 27.2% of new-borns were admitted to the NICU.

As shown in Table 2, there was a significant association between NICU admissions and women employment status ($p = 0.001$), gravidity ($p = 0.001$), parity ($p = 0.001$), medical conditions ($p = 0.049$), and mode of delivery ($p = 0.049$). There were higher rates of NICU admission among those who are employed (38.8%), whose gravidity was more than 3 (48.8%), whose parity was more than 3 (54%), whose previous abortions were two or more (53.6%), who suffered hypothyroidism (60%), and whose delivery was a CS.

4. Discussion

GBS can become extremely invasive and pathogenic to the mother and foetus

Table 1. Characters of included sample (n = 272).

Item		No. (Percentage)
Age, years	**18 - 30**	91 (33.5%)
	31 - 45	181 (66.5%)
Employment status	**Not employed**	174 (64%)
	Employed	98 (36%)
Gravidity	**1 to 3**	192 (70.6%)
	More than 3	80 (29.4%)
Parity	**Zero**	18 (6.6%)
	1 to 3	191 (70.2%)
	More than 3	63 (23.2%)
History of abortions	**Zero**	111 (40.8%)
	One	133 (48.9%)
	Two or more	28 (10.3%)
Medical conditions	**GDM**	23 (8.5%)
	HTN	6 (2.2%)
	Hypothyroidism	5 (1.8%)
	None	222 (81.6%)
	Others	16 (5.9%)
Mode of delivery	**Forceps-assisted**	5 (1.8%)
	C/S	63 (23.2%)
	NSVD	195 (71.7%)
	Ventose-assisted	9 (3.3%)
Received intrapartum antibiotics	**No**	41 (15.1%)
	Yes	231 (84.9%)
Sex of the baby	**Boy**	96 (35.3%)
	Girls	168 (61.8%)
	Twins	8 (2.9%)
New-born NICU Admission	No	198 (72.8%)
	Yes	74 (27.2%)

Table 2. NICU Admission in association with characters of included sample (n = 272).

Item		NICU Admission		P-value
		No	Yes	
Age, years	**18 - 30**	70 (76.9%)	21 (23.1%)	0.278
	31 - 45	128 (70.7%)	53 (29.3%)	
Employment status	**Not employed**	138 (79.3%)	36 (20.7%)	**0.001**
	Employed	60 (61.2%)	38 (38.8%)	

Continued

Gravidity	**1 to 3**	157 (81.8%)	35 (18.2%)	**0.001**
	More than 3	41 (51.2%)	39 (48.8%)	
Parity	**Zero**	18 (100%)	0 (0%)	**0.001**
	1 to 3	151 (79.1%)	40 (20.9%)	
	More than 3	29 (46%)	34 (54%)	
History of abortions	**Zero**	78 (70.3%)	33 (29.7%)	**0.001**
	One	107 (80.5%)	26 (19.5%)	
	Two or more	13 (46.4%)	15 (53.6%)	
Medical conditions	**Gestational diabetes**	13 (56.5%)	10 (43.5%)	**0.049**
	Hypertension	3 (50%)	3 (50%)	
	Hypothyroidism	2 (40%)	3 (60%)	
	None	166 (74.8%)	56 (25.2%)	
	Others	14 (87.5%)	2 (12.5%)	
Mode of delivery	**Forceps-assisted**	5 (100%)	0 (0%)	**0.049**
	CS	40 (63.5%)	23 (36.5%)	
	NSVD	146 (74.9%)	49 (25.1%)	
	Ventose-assisted	7 (77.8%)	2 (22.2%)	
Received intrapartum antibiotics	**No**	32 (78%)	9 (22%)	0.412
	Yes	166 (71.9%)	65 (28.1%)	
Sex of the baby	**Boy**	71 (74%)	25 (26%)	0.780
	Girls	122 (72.6%)	46 (27.4%)	
	Twins	5 (62.5%)	3 (37.5%)	

during pregnancy, having negative effects on both. Preterm birth (PTB), stillbirth, and foetal death are all consequences of invasive GBS infections during pregnancy. GBS can cause sepsis, pneumonia, and meningitis in the foetus and newborn, which can, in severe cases, have long-lasting effects on the child's central nervous system and lung function [11] [12]. GBS infections in mothers can result in postpartum endometritis and maternal sepsis [13]. Due to the vast array of the bacterium's virulence factors, which can differ greatly between strains and undergo altered expression depending on the host niche, the pathogenesis of maternal and infant GBS infection is complex.

Our study included 272 women who were diagnosed with GBS during pregnancy. We found that 84.9% received intrapartum antibiotics, however this was not associated with NICU admission for the new-born ($p > 0.05$). Of all, 27.2% of new-borns were admitted in the NICU. A major contributing factor to infection-induced PTB and stillbirth is maternal GBS infection [8]. Furthermore, out of 140 million live births in 2015, more than 20 million neonates were exposed to maternal GBS, and it is projected that half of those born to pregnant GBS-colonized women would eventually become colonised themselves [8]. In a

cautious examination of global data from a single year, GBS was shown to be responsible for at least 90,000 infant deaths (3 months of age), 10,000 instances of childhood impairment, 57,000 foetal infections or stillbirths, and 3.5 million cases of PTB.

Our study showed that there were higher rates of NICU admissions among women with higher gravidity, parity, and rates of abortions ($p < 0.05$) and that new-born NICU admissions were higher among women with more previous encounters of abortions.

Our findings agreed with those of previous studies. For instance, Shi *et al.* observed that maternal GBS at 35 - 37 weeks gestation might have a negative impact on the pregnancy because of the increased risk of uterine and newborn infections [14]. Pregnant women in Zimbabwe often colonised with GBS, according to a research by Mavenyengwa RT *et al.* [15].

According to reports, GBS is a normal flora in several organs, although the danger of invasive GBS infections increases during pregnancy [13]. Pregnant women with GBS infection may have a variety of negative side effects. Early onset GBS infection also causes severe newborn conditions that can cause significant brain damage. According to the most recent Centers for Disease Control and Prevention (CDC) screening recommendations, pregnant women between 35 and 37 weeks of gestation should be screened for rectovaginal GBS [16]. Studies examining the impact of GBS on the prognosis of pregnant women and newborns are required since the distribution of GBS differs across geographic locations.

The limitation of the study was follow up the baby who admitted to NICU.

5. Conclusion

Our study concludes that GBS infection in pregnancy is associated with higher NICU admissions. Intrapartum antibiotics were not significantly associated with NICU admissions, however, maternal medical conditions as gestational diabetes, hypertension, and hypothyroidism were. Therefore, it is important to improve GBS diagnosis in prenatal care in clinics, particularly for late-pregnancy women with high risk characteristics. The outcomes new-born may be improved by early detection and prompt intervention.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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