

Research Article

Evaluation of adverse perinatal outcome in cases with poor biophysical profile

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ABSTRACT

Objective: To determine the frequency of adverse perinatal outcome in patients with poor biophysical profile.

Study Design: Descriptive cross sectional study.

Place and Duration of the Study: Department of Obstetrics and Gynecology Victoria Hospital, Bahawalpur, July 2015 to January 2016.

Materials and Methods: A total number of 273 cases having age between 20-35 years were analyzed. All the patients had poor BPP (A score of <8 out of 10 by taking 5-parameters) screened on ultrasonographic examination, with singleton pregnancy. Gestational age was between 32-42 weeks. Frequency of adverse perinatal outcome and parity was calculated. Stratification was done to control effect modifier like maternal age, gestational age and parity.

Results: Out of a total of 273, 115 (42.1%) were between the age of 20-25 years, 97 (35.6%) between 26-30 and 61 (22.3%) between 31-35. There were 97 (35.5%) patients who were between the gestational age of 32-37 weeks and 176 (64.5%) between 38-42 weeks. Majority of the patients, 161 (59.0%) were multiparous. Majority of the patients, 197 (72.2%) had cesarean section and poor Apgar score in newborns at 5 minutes, 246 (90.1%).

Conclusion: Frequency of adverse perinatal outcome such as cesarean section and Apgar score at 5 minutes in patients with poor biophysical profile was high.

Keywords: Poor biophysical profile, cesarean section, Apgar score, gestational age.

INTRODUCTION

The biophysical profile (BPP) is a noninvasive test that predicts the presence or absence of fetal asphyxia and, ultimately, the risk of fetal death in the antenatal period.¹ When the BPP identifies a compromised fetus, measures can be taken to intervene before progressive metabolic acidosis leads to fetal death.²⁻³ The BPP combines data from 2 sources (i.e., ultrasonographic imaging and fetal heart rate [FHR] monitoring). Dynamic realtime B-mode ultrasonography is used to measure the amniotic fluid volume (AFV) and to observe several types of fetal movement. The FHR is obtained using a pulsed Doppler transducer integrated with a high-speed microprocessor, which provides a continuously

updated reading.⁴ A basic principle of antepartum testing is that a more accurate prediction of fetal wellness is achieved in direct proportion to the number of variables considered. The BPP is a clinical tool that integrates levels of dynamic biophysical activities into a usable standard.⁵ The BPP allows 2 points for each parameter that is present, yielding a maximum score of 10; however, if all ultrasonographic variables are normal, the FHR variable may be excluded because no change is made in the predictive accuracy of the BPP by including the FHR. If 1 or more ultrasonographic variables are abnormal, the NST (Non Stress test) should be performed.⁶

A recent study⁷ recorded significantly higher adverse outcome in patients having abnormal biophysical profile by calculating 77% cesarean section rate, while 100% of <8 apgar score at 5 minutes, while another study⁸ recorded these findings significantly higher (P <0.001) than normal biophysical profile, being the limitation on access the exact magnitude is missing. As there is no local study available, we are conducting this study in this remote area where facilities for invasive tests are not available and patients are non-affording therefore this noninvasive test is used to predict the presence or absence of adverse fetal outcome for their timely management and use this tool in future in our routine practice.

OPERATIONAL DEFINITIONS

POOR BIOPHYSICAL PROFILE:

A score of <8 out of 10 between 32-42 weeks of gestation was considered as poor biophysical profile, it was assessed on ultrasound by measuring 5-parameter: fetal breathing, movements, tone, amniotic fluid index and non stress test as follows:⁹

Parameter	Normal (2 points)	Abnormal (0 points)
NST/Reactive FHR	At least two FHR acceleration of > 15 bpm from baseline in 30 minutes period.	Less than two accelerations to satisfy the test in 30 minutes
US: Fetal breathing movements	At least one episode of prolonged breathing movement of > 30s in 30 minutes	Less than 30s of fetal breathing movements in 30 minutes
US: Fetal activity / gross body movements	≥ 3 movements in 30 Minutes	Less than three or absence of movements
US: Fetal muscle tone	At least one episodes of limb flexion	No evidence of fetal movement or flexion
US: Qualitative AFV/AFI	At least one largest cord free pocket or fluid of > 1 cm	Less than 1 cm pocket of fluid.

*NST= Non Stress Test , FHR = Fetal Heart Rate , AFV = Amniotic Fluid Volume
AFI = Amniotic Fluid Index*

ADVERSE PERINATAL OUTCOME:

- Cesarean section: Abdominal delivery was considered as cesarean section
- APGAR score at 5 minutes i.e. ≤8 was considered as poor apgar score

MATERIALS AND METHODS

Study design:

A descriptive cross sectional study.

Setting:

The study was carried out in the Department Of Obstetric&Gynaecology, Bahawal Victoria Hospital, Bahawalpur.

Study duration:

July 2015 to January 2016

Inclusion criteria:

- Age between 20-35 years and para 3.
- Females with poor biophysical profile (A score of <8 out of 10 by taking 5-parameters) screened on ultrasonographic examination.
- Singleton pregnancy confirmed by ultrasound.
- Gestational age: 32-42 weeks of gestation calculated by last period of menstruation and confirmed by ultrasound.

Exclusion criteria:

- Women with known medical disorders i.e. congenital fetal anomalies (on history and medical record)
- Admitted for Elective Lower Cesarean Section

Data collection procedure:

After approval from ethical committee, a total of 273 cases fulfilling the inclusion/exclusion criteria were enrolled through Department of Obstetrics/Gynecology, Bahawal Victoria Hospital, Bahawalpur after taking an informed consent to include their data in the study. History and physical examination of all the patients was done. They were screened on the basis of biophysical profile on ultrasonography to confirm the poor biophysical profile as mentioned in the table above. Patients were followed till delivery. Adverse perinatal outcome i.e. cesarean section and poor APGAR score (according to operational definition) were recorded. All this information

was recorded on a pre-designed proforma (annexure) by the researcher herself.

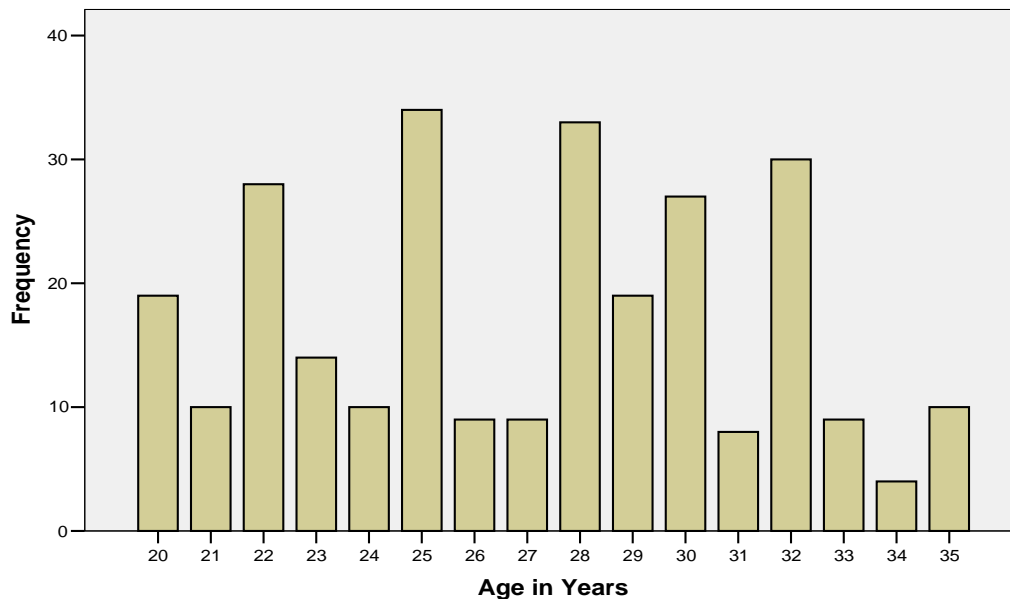
Data analysis procedure:

The data was analyzed using the statistical package for social sciences version 16.0 (SPSS 16). Descriptive statistics were applied to calculate mean and standard deviation for maternal age, gestational age. The final outcome i.e. adverse perinatal outcome (cesarean section and poor apgar score at 5 minutes) and parity of subjects were presented as frequency and percentage. Stratification was done to control effect modifier like maternal age, gestational age and parity of the patients.

RESULTS

Amongst a total of 273 patients with poor BPP, mean age was 27 years with standard deviation of 4.2. (Figure No.1)

Figure No.1: Frequency of Age in Years for patients with poor biophysical profile



(Mean age = 27 years with standard deviation of 4.2)

Table No.1: Age Distribution of patients with poor biophysical profile

Age Groups	Number	Percentage
20-25	115	42.1
26-30	97	35.6
31-35	61	22.3
Total	273	100

There were 115 (42.1%) patients who were between the age of 20-25 years, 97 (35.6%) between 26-30 and 61 (22.3%) between 31-35. (Table No.1)

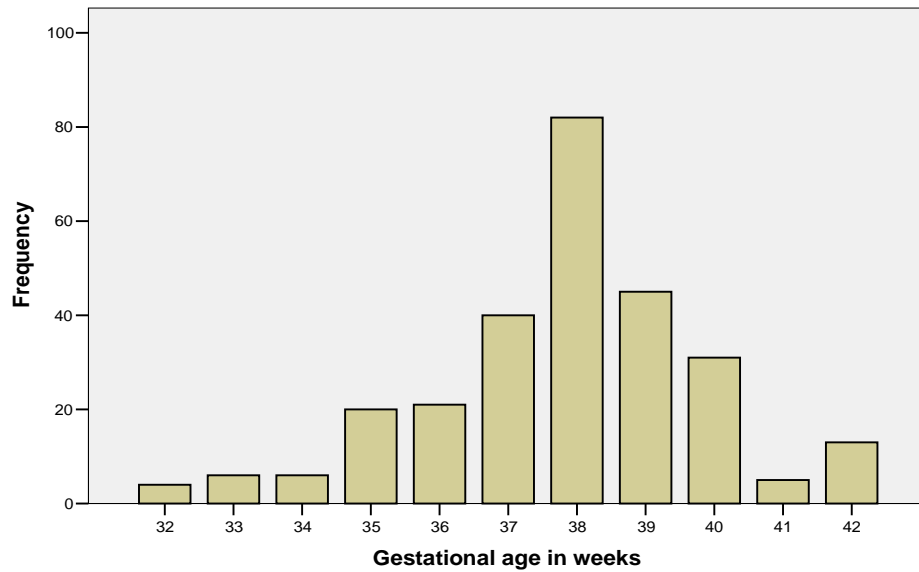
Mean gestational age of the patients was 37.8 weeks with a standard deviation of 2.0. (Figure No.2)

There were 97 (35.5%) patients who were between the gestational age of 32-37 weeks and 176 (64.5%) between 38-42 weeks. (Table No.2)

Majority of the patients, 161 (59.0%) were multiparous while 112 (41.0%) were nulliparous. (Table No.3)

When adverse perinatal outcomes between all the patients with poor BPP were noted, majority of the patients, 197 (72.2%) had cesarean section. When APGAR score at 5 minutes were noted, majority of the patients, 246 (90.1%) had poor APGAR score at 5 minutes. (Table No.4 and Table No.5)

Figure No.2: Frequency of Gestational Age in Years for patients with poor biophysical profile



(Mean gestational age = 36.65 years with standard deviation of 2.2)

Table No.2: Gestational Age Distribution of patients with poor biophysical profile

Age Groups	Number	Percentage
32-37	97	35.5
38-42	176	64.5
Total	273	100

Table No.3: Parity Distribution of patients with poor biophysical profile

Parity Status	Number	Percentage
Nulliparity	112	41
Multiparity	161	59
Total	273	100

Table No.4: Frequency of Cesarean section in patients with poor biophysical profile

Cesarean section	Number	Percentage
Yes	197	72.2
No	76	27.8
Total	273	100

Table No.5: Frequency of Poor APGAR Score in patients with poor biophysical profile

Poor APGAR Score	Number	Percentage
Yes	246	90.1
No	27	9.9
Total	273	100

DISCUSSION

In the current study, 115 (42.1%) patients were between the age of 20-25 years, 97 (35.6%) between 26-30 and 61 (22.3%) between 31-35. A study conducted by Sharamiet al⁸ noted that age does not seem to have any significant association with high risk pregnancies. Majority of the

patients in the mentioned study were between the age of 20-30 years of age.

In our study, majority of the patients (64.5%) were between the gestational age of between 38-42 weeks. Gestational age of less than 33 weeks or more than 42 weeks, maternal glucose, alcohol ingestion, maternal magnesium administration, rupture of membranes and labour are some of the factors affecting the biophysical profile scoring.⁹

One of the key components of final outcome in current study was cesarean section. Majority of the patients in current study, 197 (72.2%) had cesarean section. A recent study conducted by Manandhar BL et al¹⁰ showed that abnormal BPS increased the risk of perinatal mortality by 50% (p=0.000). This study could not detect any significant association between Apgar score and neonatal morbidities, but showed significant correlation between BPS and cesarean section. In the mentioned study, nine (60%) of 15 subjects from BPS 8 group and three (75%) of four subjects from BPS 4 group had caesarean.

In our study, poor APGAR score at 5 minutes was noted in 246 (90.1%) patients. Although, the proportion seems to be high but while examining poor BPP and Apgar score at five minutes, no positive relationship was found out in a current study.¹⁰ On the contrary, a study by Hina et al,¹¹ reported better correlation between BPP score and Apgar score. The possible explanation for the variation of the result could be because of difference in proportions of subjects having IUGR babies, 12% in the study conducted by Manandar BL et al¹⁰ and 35% in the later study.¹¹

A Cochrane systematic review conducted on the use of BPP in fetal assessment in high risk pregnancies^{2,12} stated that most trials were of poor quality and found no significant differences between the groups in perinatal deaths or Apgar score less than seven at five minutes. There was an increased risk of caesarean section in the BPP group. They suggested additional studies to be definitive regarding the efficacy of BPP in high-risk pregnancies.

It has been shown that normal biophysical profile score confers a high probability of perinatal survival.¹³ A fetus with a low score especially in the last BPP score has been shown to have a high perinatal mortality rate, higher incidence of fetal distress, admission to the neonatal unit, intrauterine growth restriction, five minute Apgar score less than seven and umbilical artery pH less than 7.20. These data strongly suggest the biophysical profile scoring method of fetal risk

assessment is accurate and also provides insight into the extent of foetal compromise.¹⁴

BPP also seemed to have a higher sensitivity as compared to other methods like NST in a previously conducted study where fetal biophysical profile scoring had a higher sensitivity and specificity. The negative predictive value between the two methods was similar.¹²⁶

There was a demonstrable reduction in the incidence of cerebral palsy when BPP was used as a tool in antepartum assessment when compared with untested patients. A low score increases the likelihood of cerebral palsy.¹⁵

The biophysical profile testing gives a numerical score and thus an objective assessment of the various physiological components of the fetus that can be compromised due to fetal hypoxia and academia. Such a scoring system will provide the clinician with criteria that will enable uniformity in the management of high risk fetuses. When the BPP identifies a compromised fetus, measures can be taken to intervene before progressive metabolic acidosis leads to fetal death.

This is the first study of its kind in our setting in this remote area where facilities for invasive tests are not available and patients are non affording therefore this non invasive test can be used to predict the presence or absence of adverse fetal outcome for their timely management.

CONCLUSION

Frequency of adverse perinatal outcome such as cesarean section and Apgar score at 5 minutes in patients with poor biophysical profile was high. The biophysical profile testing gives a numerical score and thus an objective assessment which can be used in detecting various degrees of fetal compromise. In pregnancies at increased risk for adverse perinatal outcome, biophysical profile can provide a valuable assistance for evaluation of fetal well-being.

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