



## FREQUENCY OF ADVERSE PERINATAL OUTCOME IN PATIENTS WITH POOR BIOPHYSICAL PROFILE.

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### INTRODUCTION

The biophysical profile (BPP) is known to be a non-invasive test that can help predicting the presence or absence of fetal asphyxia.<sup>1</sup> BPP helps in identification of compromised fetus so than measures stopping progressive metabolic acidosis progressing in to fetal death can be taken<sup>2,3</sup>

The BPP comprise of data from two sources that are ultrasonographic imaging as well as monitoring of the fetal heart rate (FHR). Dynamic real-time B-mode ultrasonography (USG) is employed to find out the amniotic fluid volume (AFV) and to note various types of fetal movements. FHR and information regarding the wellness of the fetus are obtained using cardiotocograph (CTG).<sup>4</sup>

One of the basic principles of antepartum testing is to accurately predict the well-being of the fetus which is attained in direct proportion to number of variables considered. BPP is designed to integrate various biophysical activities into usable and measurable standards.<sup>5</sup> BPP grants two

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**ABSTRACT... Objectives:** To find out the frequency of adverse perinatal outcome among patients having poor BPP. **Study Design:** Descriptive study. **Setting:** Nishtar Hospital Multan. **Period:** From August 2018 to November 2019. **Material & Method:** In this study, 273 cases fulfilling the inclusion criteria were enrolled. They were screened on the basis of biophysical profile on ultrasonography to confirm the poor biophysical profile. Patients were followed till delivery. Adverse perinatal outcome i.e. cesarean section and poor APGAR score were recorded. Stratification was done to control effect modifier like maternal age, gestational age and parity. **Results:** A total of 273 patients with poor biophysical profile were included. The mean age of patients was 27+4.2 years whereas mean gestational age was 37.8+2.0 weeks. Out of 273 patients, 197 (72.2%) patients had cesarean section. A total of 246 (90.1%) patients had poor APGAR score at 5 minutes. **Conclusion:** Frequency of adverse perinatal outcome such as cesarean section and Apgar score at 5 minutes in patients with poor BPP was high.

**Key words:** APGAR Score, Cesarean Section, Gestational Age, Poor Biophysical Profile.

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points to each parameter present, and can yield the highest score of 10. It is also important to note that if USG findings are normal for all variables, FHR can be excluded. If one or more than one USG variables are abnormal, non-stress test (NST) needs to be performed.<sup>6</sup>

A recent study<sup>7</sup> 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 study<sup>8</sup> 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.

## MATERIAL & METHODS

It was a descriptive cross sectional study carried out in the Department Of Obstetrics & Gynecology, Nishtar Medical University Multan from August 2018 to November 2019. After approval from ethical committee, a total of 273 cases fulfilling the inclusion/exclusion criteria were enrolled 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. Inclusion criteria includes age between 20-35 years and para 3, 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. Women with known medical disorders i.e. congenital fetal anomalies (on history and medical record) were excluded from study.

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.<sup>9,10</sup>

Patients were followed till delivery. Cesarean section and poor APGAR score (at 5 minutes i.e.  $\leq 8$ ) were considered as adverse perinatal outcome.

The data was analyzed using the statistical package for social sciences version 16.0 (SPSS 16). Descriptive statistics were applied to calculated 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

The mean age of patients was 27 years with standard deviation of 4.2 years. There were 115

(42.1%) patients who were between the age of 20 to 25 years, 97 (35.6%) patients above 25 to 30 and 61 (22.3%) patients were above 30 to 35.

The mean gestational age of the patients was 37.8 weeks with a standard deviation of 2.0 weeks. There were 97 (35.5%) patients between the gestational age of 32 to 37 weeks and 176 (64.5%) patients were between above 37 to 42 weeks. Out of 273 patients, 161 (59.0%) patients were multigravida while 112 (41.0%) patients were nulliparous.

Out of 273 patients, 197 (72.2%) patients had cesarean section. There were 85 patients in 20-25 years of age group had cesarean section while 30 patients had no cesarean section, 66 patients in 26-30 years of age group had cesarean section while 31 patients had no cesarean section and 46 patients in 31-35 years of age group had cesarean section while 15 patients had no cesarean section with insignificant p value of 0.518.

There were 71 patients between 32 to 37 weeks of gestational age who had cesarean section while 26 patients had no cesarean section and 126 patients above 37 to 42 weeks of gestational age who had cesarean section while 50 patients had no cesarean section with insignificant p value of 0.777.

There were 84 patients of nulliparity had cesarean section while 28 patients had no cesarean section and 113 patients of multiparity had cesarean section while 48 patients had no cesarean section with insignificant p value of 0.383.

When APGAR score at 5 minutes were noted, 246 (90.1%) had poor APGAR score. There were 102 patients in 20 to 25 years of age group who had poor APGAR score while 13 patients had no poor APGAR score, 88 patients were above 25 to 30 years of age group with poor APGAR score while 9 patients had no poor APGAR score and 56 patients were above 30 to 35 years of age group who had poor APGAR score while 5 had no poor APGAR score with insignificant p value of 0.781.

There were 81 patients of 32-37 weeks of gestational age had poor APGAR score while 16 patients had no poor APGAR score and 165 patients of 38-42 weeks of gestational age had poor APGAR score while 11 patients had no poor APGAR score with significant p value of 0.007.

There were 99 patients of nulliparity who had poor APGAR score while 13 patients had no poor APGAR score and 147 patients of multiparity who were having poor APGAR score while 14 patients had no poor APGAR score with insignificant p value of 0.428.

Parameters	Normal (Two Points)	Abnormal (Zero Points)
NST/Reactive FHR	Minimum 2 FHR acceleration of > 15 bpm from baseline in 30 minutes period.	< 2 accelerations to satisfy the test in 30 minutes
US: Fetal breathing movements	Minimum 1 episode of prolonged breathing movement of > 30s in 30 minutes	< 30s of fetal breathing movements in 30 minutes
US: Fetal activity / gross body movements	≥ 3 movements in 30 Minutes	< 3 or absence of movements
US: Fetal muscle tone	Minimum 1 episode of limb flexion	No evidence of fetal movement or flexion
US: Qualitative AFV	Minimum 1 largest cord free pocket or fluid of > 1 cm	< 1 cm pocket of fluid

**Table-I. Biophysical profile testing parameters and scoring.**  
NST= Non Stress Test, FHR = Fetal Heart Rate, AFV = Amniotic Fluid Volume

Characteristics	Number (%)	
Age	20-25	115 (42.1%)
	26-30	97 (35.6%)
	31-35	61 (22.3%)
Gestational Age	32-37	97 (35.5%)
	38-42	176 (64.5%)
Parity Status	Nulliparity	112 (41.0%)
	Multiparity	161 (59.0%)
Cesarean Section	Yes	197 (72.2%)
	No	76 (27.8%)
Poor APGAR Score	Yes	246 (90.1%)
	No	27 (9.9%)

**Table-II. Characteristics of Patients with Poor Biophysical Profile.**

Study Variables	Cesarean Section		P-Value
	Yes (n=197)	No (n=76)	
Age Groups (Years)	20 to 25	85 (43.1%)	0.518
	>25 to 30	66 (33.5%)	
	> 30 to 35	46 (23.4%)	
Gestational Age Groups (weeks)	32 to 37	71 (36.0%)	0.777
	>37 to 42	126 (64.0%)	
Parity Status	Nulliparity	84 (42.6%)	0.383
	Multiparity	113 (51.4%)	

**Table-III. Comparison of cesarean section with respect to study variables.**

Study Variables		Poor APGAR Score		P-Value
		Yes (n=246)	No (n=27)	
Age Groups (Years)	20 to 25	102 (41.5%)	13 (48.1%)	0.781
	>25 to 30	88 (35.8%)	9 (33.3%)	
	> 30 to 35	56 (22.7%)	5 (18.5%)	
Gestational Age Groups (weeks)	32 to 37	81 (32.9%)	16 (59.3%)	0.007
	>37 to 42	165 (67.1%)	11 (40.7%)	
Parity Status	Nulliparity	99 (40.2%)	13 (48.1%)	0.0428
	Multiparity	147 (59.8%)	14 (51.9%)	

**Table-IV. Comparison of cesarean section with respect to study variables.**

## DISCUSSION

Quite a few surveillance tests are in use to find out the wellness of the fetus during specific intervals of time. Oxytocin challenge test (OCT) / contraction stress test (CST), CTG, BPP and Doppler evaluation of fetal blood flow are some of the most common tools adopted. While each of these tests are beneficial presenting important aspects about fetal wellness, not of these have been found to provide sufficient sensitivity or specificity alone.<sup>9,10</sup>

Manning FA et al<sup>10</sup> in 1980 suggested the fetal BPP to evaluate fetal well-being as well as to identify compromised fetus. The authors suggested combined fetal biophysical testing as more accurate way for antepartum fetal evaluation than any of the other single methods.

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 al<sup>8</sup> 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. It has been stated in the past that gestational age below 33 weeks or above 42 weeks, maternal glucose, alcohol intake, maternal magnesium administration, rupture of membranes and labour are few of the important factors that can influence BPP scores.<sup>11</sup>

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 al<sup>12</sup> showed that abnormal BPP increase chances of perinatal mortality by 50% (p=0.000). While the said research could not find any major linkage between Apgar score and neonatal morbidities but found significant association between BPP and cesarean section.

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.<sup>12</sup> On the contrary, a study by Hina et al<sup>13</sup>, 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 al<sup>12</sup> and 35% in the later study.<sup>13</sup>

A Cochrane systematic review analyzing the role of BPP for fetal assessment among high risk pregnancies described that majority of the studies were of poor quality. That review also noted that there was no significant difference among groups in terms of perinatal mortality or Apgar score of less than 7 at 5 minutes. BBP group had higher chances of cesarean section whereas it was also stated that more studies should be done to further assess the effectiveness of BPP among high risk pregnancies.

It has been shown that normal BPP scores describe

high probability of perinatal survival<sup>15</sup> while low scores describe higher chances of perinatal mortality. Increased incidence of fetal distress, admission into neonatal unit, intrauterine growth restriction, 5 minute Apgar score < seven and umbilical artery pH < 7.20. These data strongly suggested BPP scoring for fetal risk assessment as accurate.<sup>16</sup>

BPP also seemed to have a higher sensitivity as compared to other methods like NST in a previously conducted study where fetal BPP scoring had better sensitivity as well as specificity while the negative predictive values among these methods did not differ statistically.<sup>17</sup>

In comparison to untested cases, major reduction in the incidence of cerebral palsy (CP) was noted when BPP was employed during antepartum assessment.<sup>17</sup> It also suggested that low BPP scores increase the likelihood of CP.

The BPP 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 noninvasive 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 BPP was high. The BPP 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, BPP can provide a valuable

assistance for evaluation of fetal well-being.




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## REFERENCES

1. GuimarãesFilho HA, Araujo Júnior E, Nardoza LM, Dias da Costa LL, Moron AF, Mattar R. **Ultrasound assessment of the fetal biophysical profile: What does a radiologist need to know?** Eur J Radiol. 2008; 66:122-6.
2. Lalor JG, Fawole B, Alfirevic Z, Devane D. **Biophysical profile for fetal assessment in high risk pregnancies.** Cochrane Database Syst Rev. 2008; CD000038.
3. Filho GHA, Araujo E, Nardoza LM, Costa DLL, Moron AF, Mattar R. **Ultrasound assessment of the fetal biophysical profile: What does a radiologist need to know?** Eur J Radiol. 2008; 66:122-6
4. Ullah N, Usman M, Khan AR. **Sonographic biophysical profile in detection of foetal hypoxia in 100 cases of suspected high risk pregnancy.** J Ayub Med Coll Abbottabad. 2010; 22:77-80.
5. Turan S, Miller J, Baschat AA. **Integrated testing and management in fetal growth restriction.** SeminPerinatol. 2008; 32:194-200
6. Phattanachindakun B, Boonyagulsrirung T, Chanprapaph P. **The correlation in antepartum fetal test between full fetal biophysical profile (FBP) and rapid biophysical profile (rBPP).** J Med Assoc Thai. 2010; 93:759-64.
7. Bano B, Zahid B, Hussain U. **Fetal biophysical profile; as a tool to predict fetal outcome.** Professional Med J. 2010; 17:670-5.
8. Sharami SH, Zahiri Z, Mirbolouk F, Faraji R, Sobhani AAR. **Prenatal outcomes in high risk pregnancies according to biophysical profile without non-stress test.** J GuilUniver Med Sci. 2009; 17; 27-33.
9. Health, United States, **2004 with Chartbook on Trends in the Health of Americans.** Hyattsville, Maryland: National Center for Health Statistics, 2004.
10. Manning FA, Platt LD, Sapos L. **Antepartum fetal evaluation: Development of a fetal biophysical profile.** Am J ObstetGynecol 1980; 136: 787.
11. Mirghani HM, Weerasinghe DSL, Ezimokhai M, Smith JR. **The effect of maternal fasting on the fetal biophysical profile.** Int J Gynaecol Obstet. 2003; 81:17-21.
12. Manandhar BL, Giri K, Rana A. **Fetal biophysical profile score and perinatal outcome.** J Nepal Health Res Counc. 2013; 11:269-72.

13. Mohsin H. **Neonatal outcome as prescribed by biophysical profile.** J Coll Physician Surg Pak. 2001; 11:149-51.
14. Alfirevic Z, Neilson JP. **Biophysical profile for fetal assessment in high risk pregnancies.** Cochrane Database Syst Rev. 2000; (2):CD000038.
15. Manning FA, Morrison I, Harman CR, Lange IR, Menticoglou S. **Fetal assessment based on fetal biophysical profile scoring: Experience in 19,221 referred high risk pregnancies.** Am J ObstetGynecol 1987; 157:880.
16. Manning FA Lange IR, Morrison I, Harman CR. **Fetal biophysical profile score and the nonstress test: A comparative trial.** Obstet Gynecol 1984; 64:326.
17. Manning FA, Bondaji N, Harman CR, Casiro O, Menticoglou S, Morrison I, et al. **Fetal assessment based on fetal biophysical profile scoring: VIII. The incidence of cerebral palsy in tested and untested perinates.** American Journal of Obstetrics & Gynecology. 1998; 178:696-706.

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2	Ahmed Iqbal Quddusi	Introduction, Results, Discussion.	
3	Naima Yasmeen	Introduction, Discussion, Results.	
4	Aashee Nadeem	Introduction, Results, Discussion.	