Section: Obstetrics and Gynaecology

Original Research Article

# MODIFIED BIOPHYSICAL PROFILE AND PERINATAL OUTCOME IN HIGH RISK PREGNANCY

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## Abstract

**Background:** To evaluate fetal health in high risk pregnancy by modified biophysical profile and evaluate efficiency in predicting outcome in high risk pregnancy. **Materials and Methods:** A prospective cohort study was done on 200 antenatal women with one or more risk factors like IUGR, PIH, GDM, BOH, PREV.LSCS, PROM for a period of 1 year to evaluate the perinatal outcome by modified biophysical profile. **Result:** If AFI is used for predicting the perinatal outcome, sensitivity is highest in low birth weight and APGAR Score. PPV is high for all the factors except perinatal death. When modified BPP is taken into consideration and predictability of perinatal outcome studied. sen is high for APGAR score and low birth weight. PPV is high in all the parameters. NPV is low for all the parameters. If NST and AFI are considered individually and compared with predictability of modified BPP, there is increase in PPV for perinatal outcome by MBPP which indicates that is a reliable diagnostic test to predict the positive outcome and negative test does not imply that the fetus is compromised Hence further testing with full length BPP may be required There is no rise in sensitivity of MBPP when compared with individual sensitivity of NST and AFI implies that these tests are also equally reliable than that of MBPP. **Conclusion:** MBPP can be replaced by further advanced method of testing like computerized CTG with high accuracy if there are no financial constraints.

## INTRODUCTION

Globally, every year there are three million still births and three million neonatal deaths. The causes are multiple but main ones are preterm birth, infection and trauma significant proportion is due to antenatal, intra-partum or postnatal hypoxia.[1,2] As more than two thirds of fetal deaths occur before the onset of labor as a result of the antenatal complications pregnancy, it would be ideal to follow the practice of extending the fetal monitoring to antenatal period also in an effort to prevent the complications and fetal deaths.[3] There is lack of awareness in the rural population regarding importance of regular antenatal visits hospitalization in high risk cases if required and approach to health care in time at the onset of labor hence this topic has been selected. This study can pick up the high risk cases, regular monitoring can be done timely action can be taken to yield a better perinatal outcome. This study is carried out in a tertiary care center, where maximum inflow of patients is from rural background in this center facilities like pediatrician anesthetist NICU set up, operation theatre Lab facilities ultrasound are all available found the clock. Hence. better perinatal care ensured.

## MATERIALS AND METHODS

This study was carried out in the antenatal ward, labour room, postnatal ward and NICU in the department of Obstetrics and gynecology from January 2015 to June 2016. It is a prospective cohort stud. Total 200 patients having one or more risk factors like postdated pregnancy IUGR gestational hypertension, GDM, PROM, BOH, anemia previous LSCS, Rh negative pregnancy were selected and studied. Ethical clearance taken from the ethical committee of institution and study proceeded

**Inclusion Criteria**

Singleton pregnancy, Primigravida, Multigravida, age 18-35 yrs, Non-anomalous fetuses, Gestational age 32 weeks with one or more risk factors like Gestational hypertension, IUGR, GDM, PROM, pervious caesarean section, anemia, BOH. Postdated pregnancy, Rh-negative mothers.


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**Exclusion Criteria**

With no risk factors, Antepartum heamorrhage, Pregnancies after assisted reproductive technology, <32 wks of gestation, Anomalous fetus and Multifetal gestation.

High risk cases selected from the outpatient department, informed consent taken admitted if required based on severity of disease, Serial ultrasound taken for AFl values weekly and bi weekly NST done Doppler study done weekly, appropriate treatment for the disease started. All other basic investigations in antenatal profile done. Based on last NST, AFI within one week of delivery and the pertaining risk factor of the patient, mode of delivery decided either as elective caesarean section, emergency caesarean section, normal vaginal delivery or instrumental vaginal delivery are conducted. APGAR noted at 0 and 5min, Neonates with low APGAR score, meconium staining of liquour low birth weight and other complications are admitted immediately in NICU and neonate with pathological jaundice, sepsis Neonatal seizures etc are admitted later on If required. All neonates followed up for 6 weeks after delivery -perinatal outcome has been decided based on the parameters like fetal distress during labor, APGAR score, NICU admission, Low birth weight, meconium staining of liquor. perinatal death.

**Method of Performing NST**: Non-stress test is a non-invasive procedure of antepartum fetal surveillance BPL, NST machine is used, patient is placed in left lateral position. On a bed two transducers are placed over the abdomen, the one for FHR is placed at the position where FHS is heard by auscultation and the probe for tocograph is placed over the fundus of the uterus and with this electronic monitor, both the fetal heart and the uterine contractions are recorded in the form of a graph. Trace is take for 20 minutes continuously and is interpreted after 20 minutes.

**Interpretation of NST:**

It contains four variables:

1. Baseline FHR-Normal values :110-160 bpm.
2. Beat to beat variability- Fetal heart rate variability from baseline (Normal variability 5-25 beats / second).
3. Accelerations - Increase in fetal heart rate from the baseline by atleast 15 beats/min lasting for atleast 15 seconds. Two accelerations in a 20 min trace is satisfactory.
4. Decelerations It is decrease in FHR from the baseline by atleast 15 beats/min lasting for 15 seconds, There should not be any deceleration in FHR in a normal NST. There are different types of decelerations.

1. Early deceleration: Begins at start of uterine contraction and end with contraction. This is due to fetal head compression.
2. Variable deceleration: Deceleration noticed any time irrespective of uterine contraction. A sign of umbilical cord compression.
3. Late deceleration: Begins at peak of contraction and ends long after it. This is a sign of fetal hypoxia due to uterus or placental insufficiency. This is the most worrisome deceleration.

According to NICE guidelines, NST is said to be reassuring when BHR is 110-160, variability >5 no decelerations and 2 accelerations in 20 min. lt is Non reassuring if BHR is 100-109 or 160-180, variability <5 for more than 40 min and <90 min, typical variable decelerations and no accelerations.

It is said to be abnormal if BHR <100 or 180, variability<5 for 90 min atypical variable or late decelerations or single prolonged deceleration for more than 3 min. CTG is said to be normal if all the four features are reasuuring. Suspicious if one feature is non reassuring and pathological if one or more features are abnormal.

**Amniotic Fluid Index:** Amniotic fluid is maintained in a dynamic equilibrium. lts volume is determined by fluid flowing into and out of the amniotic cavity. Normal amniotic fluid volume at different gestational ages are: >25 m- 10 wks. 400 mi- 20 wks. 900- 1100 mi 32 wks. Disruption of the process of amniotic fluid production, removal and absorption will cause an abnormal reduction or increase in amniotic fluid volume. Therefore, abnormal amniotic fluid volume is important indicator for a range of varying fetal abnormalities, Higher rates of still birth, growth restriction, non-reassuring heart rate pattern and mecorium aspiration syndrome were noted.

Sonographic measurement of AFI is based on four quadrant technique. By adding vertical pockets of amniotic fluid in all the four quadrants of maternal abdomen, AFI is obtained. Four quadrant technique of measurement was Suggested in 1987 by Phelanet al. A single deepest pocket measurement technique was introduced by Davies et al in 2000

| | |
|---|---|
| Normal: | 8-25 cms |
| Borderline: | 5-8 cms |
| Oligohydramnios: | <5 cms |
| Polyhydramnios: | >25 cms |

Single deepest vertical pocket can also be measured SDP <2 cm is oligohydramnios and 8 cms polyhydramnios.

**Statistical Methods:** Data was transferred to an Excel 2007 spread sheet and analysed by SPSS (statistical package for social sciences version 170) An unpaired student t-test was applied to evaluate the correlation between these variables. level of significance considered was $p<0.05$.


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## RESULTS

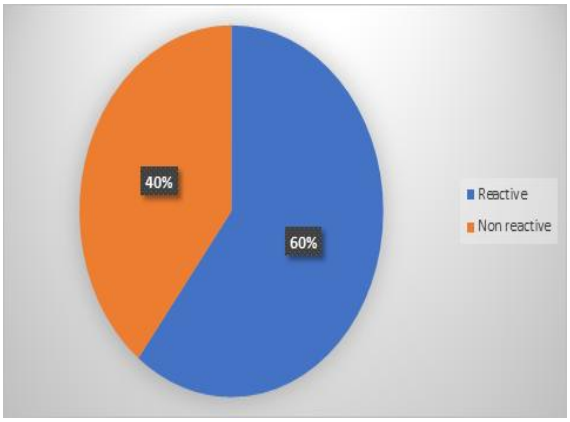


**Figure 1: Distribution of high risk cases according to last NST pattern**

Most common high risk factors in the patients included in study is IUGR Le., 61(30.596) followed by hypertensive disorder 34(17%), PROM 21(10.5%), Anaemia t16(8%) postdated pregnancy 16(8%). breech 14 (7%), prev. LSCS 12(6%, Rh negative (4.5%), GDM (3%), BOH 6(3%), short stature 6(25%).

Distribution of high risk cases according to last NST pattern total number og reactive cases are 121(60.5%) and non reactive cases are 79(39.5%).

**Table 1: Distribution of high risk cases according to their risk factor**

| Risk factors | Number of cases | Percentages |
|---|---|---|
| IUGR | 61 | 30.5% |
| PIH | 34 | 17% |
| PROM | 21 | 10.5% |
| Anemia | 16 | 8% |
| Post dated pregnancy | 16 | 8% |
| Breech presentation | 14 | 7% |
| Prev. LSCS | 12 | 6% |
| Rh negative | 9 | 4.5% |
| Short stature | 5 | 2.5% |
| BOH | 6 | 3% |
| GDM | 6 | 3% |

**Table 2: Distribution of cases according to last AFI values**

| AFI values | Number of cases | Percentages |
|---|---|---|
| <5 | 30 | 15% |
| >5-<8 | 56 | 28% |
| 8-25 | 114 | 57% |

It shows the distribution of cases according to AFI values within 1 week of delivery. Number of cases with AFI < 5-30 (15%). Number of cases with AFI values> 5-<8 -56(28%) and 8-25 are 114(57%).

**Table 3: Correlation of last NST pattern with mode of delivery**

| NST pattern | Reactive(121) | % | Non-reactive(79) | % |
|---|---|---|---|---|
| Normal delivery | 41 | 33.8% | 11 | 13.92 |
| Caesarean section | 71 | 58.6% | 64 | 81% |
| Forceps | 9 | 7.4% | 4 | 5% |

P-value: 0.02321(significant)

Correlation of last NST pattern with mode of delivery. In reactive NST pattern (121) cases, 41 cases had normal delivery (33.8%). 71 cases had caesarean section (58.6%) and 9 had forceps delivery (7.4%). Among the non-reactive NST patients (79) 11 had normal delivery (13.9%), 64 has caesarean section (81%) and 4 cases underwent forceps delivery (5%).

**Table 3: Correlation of last NST pattern with mode of delivery**

| NST pattern | <5 (30) | % | <5-<8 | % | 8-25 | % |
|---|---|---|---|---|---|---|
| Vaginal | 6 | 20% | 20 | 35.7% | 26 | 22.8% |
| Caesarean section | 24 | 80% | 32 | 57.1% | 79 | 69.2% |
| Forceps | 0 | 0 | 4 | 7.1% | 9 | 7.8% |

Correlation of AFI with mode of delivery out of 30 cases of AFI<5, 6 had vaginal delivery (28%) and 24 had caesarean section (80%), no patient had forceps delivery. Out of 56 cases of AFI > 5 < 8.20 had vaginal delivery. 32 had caesarean section 57 1%), 4 had forceps delivery. Out of 114 cases who ad AFI >8, 25 had vaginal delivery (22.8%) and 79 had caesarean section (69%) and 9 had forceps delivery-7.8%.


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**Table 4: Correlation of last NST pattern with perinatal outcome.**

| NST pattern | Reactive(121) | % | Non-reactive(79) | % | p- value |
|---|---|---|---|---|---|
| Fetal distress | 28 | 23.1% | 69 | 87.34 % | 0.000* |
| APGAR <6 | 17 | 14% | 21 | 26.58% | 0.02722* |
| NICU admission | 59 | 48.7% | 26 | 32.9% | 0.47 |
| Low birth weight | 12 | 9.9% | 14 | 17.7% | 0.266* |
| Meconium | 8 | 6.6% | 9 | 11.39% | 0.23 |
| Perinatal death | 1 | 0.8% | 5 | 6.32% | 0.025 |

Correlation of last NST pattern with perinatal outcome, out of 121 cases of reactive NST, 28 cases (23.2%) had fetal distress and 69 patients (87.34%) had fetal distress with non-reactive NST in Reactive NST, 17 cases had APGAR <6(14%) and 21 cases (26.58%) had APGAR <6 with Non-reactive category. Reactive category 12 cases (9.9%) had low birth weight and 17.72% (14 cases) had low birth in Non-reactive cases, 8 cases (6.6%) had meconium staining with reactive NST and 9 cases (11.39%) had meconium staining with non-reactive NST. 1 case (0.8%) had perinatal death in reactive cases and 5 had non-reactive NST category ie., 6.32%.

**Table 5: Correlation of last AFI pattern with perinatal outcome**

| NST pattern | <5 (30) | % | <5-<8 | % | 8-25 | % | P-value |
|---|---|---|---|---|---|---|---|
| Fetal distress | 19 | 63.3% | 32 | 57.1% | 46 | 40.35% | 0.079 |
| APGAR <6 | 9 | 30% | 11 | 19.6% | 18 | 15.7% | 0.097 |
| NICU admission | 19 | 63.3% | 26 | 46.4% | 70 | 61.4% | 0.002* |
| Low birth weight | 13 | 43.3% | 15 | 26.7% | 19 | 16.6% | 0.48 |
| Meconium | 3 | 10% | 6 | 10.7% | 8 | 7% | 0.75 |
| Perinatal death | 3 | 10% | 0 | 0 | 3 | 2.6% | 0.015* |

Correlation of last AFI pattern with perinatal outcome. Among 30 cases of AFI < 5, 19 had fetal distress (63.33%) 9 had APGAR 6 (30%), 19 had NICU admission (83.33%) low birth weight 13 (43.33%) and meconium staining in 3 (10%). perinatal death in 3(10%). In the category of AFI>5-<8, 32 had fetal distress (57.14%) 11 had APGAR < 6 (19.64%), 26 had NICU admission (46.42%) 15 had low birth weight 26.78S) 6 had meconium staining (10%) and 0 cases had perinatal death. n he category of AFI>8 out of 114 patients 46 had fetal distress 40.35%) 8 had APGAR 6(15.78%), 70 had NICU admission (61.49%), 19 had low birth weight (16.666), 8 had meconium staining (7%) and 3 cases of perinatal death (2.63%).

**Table 6: Predictability of perinatal outcome with last NST pattern and AFI**

| Perinatal outcome | Sensitivity | Specificity | PPV(%) | NPV(%) |
|---|---|---|---|---|
| **Predictability of perinatal outcome with last NST pattern** | | | | |
| Fetal distress | 23.1 | 12.66 | 28.8 | 9.7 |
| APGAR <6 | 85.9 | 26.5 | 64.2 | 55.2 |
| NICU admission | 51.2 | 32.9 | 53.9 | 30.5 |
| Low birth weight | 90 | 17.7 | 62.6 | 53.8 |
| Meconium | 6.6 | 88.6 | 47 | 38.2 |
| Perinatal death | 0.8 | 93 | 16.7 | 38 |
| Combined | 42.9 | 45.3 | 45.5 | 37.6 |
| **Predictability of perinatal outcome with AFI** | | | | |
| Fetal distress | 45.8 | 36.7 | 80.4 | 10.68 |
| APGAR <6 | 82.9 | 30 | 87 | 23.6 |
| Low birth weight | 90 | 30 | 87.9 | 34.6 |
| NICU admission | 56.4 | 36.7 | 83.5 | 12.9 |
| Meconium | 8.2 | 90 | 82 | 14.7 |
| Perinatal death | 1.76 | 90 | 50 | 13.9 |
| Combined | 40.8 | 52 | 78.5 | 18.4 |

**Table 7: Comparision of the predictive of perinatal outcome by NST, AFI and modified biophysical profile**

| Variables | Sensitivity | Specificity | PPV(%) | NPV(%) |
|---|---|---|---|---|
| AFI | 47.1 | 52.2 | 71.3 | 18.4 |
| NST | 42.9 | 45.3 | 45.54 | 37.6 |
| Combined | 47.1 | 43.3 | 88.3 | 6.5 |

## DISCUSSION

In this study of 200 high risk cases, including risk factors like UGR, PIH, BOH GDM, Postdated pregnancy, PROM, Anemia, Breech presentation, previous LSCS. Short stature, Rh-negative status, Incidence of IUGR is highest i.e 30.5% followed by gestational hypertension. Antepartum fetal surveilliance plays a major role in managing these high risk cases for detecting early signs of compromise and timely action taken to deliver the baby. But the question is which test to use.[3] NST


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was introduced is 1950s and remains the test of choice. since then to monitor FHR in antenatal period in high risk cases. According to the clinical studies done early NST has high specificity and low sensitivity Hence. it may be used in isolation or combined with other methods of assessment, such as ultrasound for measuring the amniotic fluid volume. Both combined gives the modified biophysical profile. Among all the high risk cases 60.5% had reactive pattern of NST and 39.5% nonreactive. When the AFI values within1 week of delivery analyzed 15% had AFI < 5 and rest 85% >5-25.

Mode of delivery analyzed in terms of NST pattern 33.80% had normal delivery in reactive NST and 58.6% had caesarean section and 7.4% had instrumental delivery. The decision for C.S could be based on factors other than NST and AFI like previous CS cases are not given trial. In spite of Nonreactive NST 13.92% had normal delivery rest 86% had caesarean section and forceps delivery timely action was taken in these cases and emergency caesarean section done. When AFI values are corelated with mode of delivery 20% of cases of oligohydramnios (AF|<5) delivered vaginally rest 80% had caesarean section. In the category of AFI 8-25 i.e., normal AFI 22.8% had vaginal delivery and 69.2% had caesarean section rest had instrumental delivery. When NST pattern is corelated with the individual factors considered in deciding the perinatal outcome like fetal distress before or during labour. APGAR Score, NICU admissions, low birth weight, meconium stained liquor and perinatal deaths Among 121 cases of reactive NST 23.1% had fetal distress and among 79 cases of non-reactive NST 87.34% had fetal distress.14% of reactive cases had APGAR < 6 and 26.58% of Non-reactive NST cases had low APGAR score. 48.76% of reactive NST cases were admitted to NICU and 32.91% of Non-reactive NST cases were admitted. The reason for high admissions in NICU in reactive cases could be the other pathologies like hyperbilirubinemia, neonatal sepsis etc after 2 or 3 days after birth. 9.9% of total reactive cases low birth weight babies (< 2 kgs) and 17.72% of non-reactive cases had low birth weight. 6.6 of total reactive NST cases had meconium stained liquour and 11.39 of non-reactive cases had the same. Among total 6 perinatal deaths, 1 death occurred in reactive NST pattern patient and 5 deaths in non-reactive NST pattern which is 6.329% of total non-reactive NST If deaths considered individually 16.67% of deaths occurred in reactive NST pattern and 83.33% occurred in Non-reactive NST pattern. When last AFl values are compared with the perinatal outcome individually 63.33% of total patients with AFI < 5 had fetal distress. In border line AFI > 5-8, 57.14% had distress and in normal AFI >8-25, 40.35% had fetal distress. When APGAR Scores are compared. 30% of oligohydramnios cases had less APGAR, 19.64% in borderline values and 15.78% in normal values of AFI. AFI. 63.33% had NICU admission in AFI <5, 46.42% in borderline and 61.4% in normal Low birth weight baby's percentage is more in oligohydramnios (AFI < 5). Meconium staining of liquour is almost same in both low AFI category and borderline AFI category. There are 10% deaths in low AFl cases and 2.63% in normal AFI. All these data put together, sensitivity, specificity. positive predictive value. negative predictive value of NST and AFl are calculated in relation to perinatal outcome individually. When NST pattern is taken into account and compared with fetal distress, predictability of abnormal NST for feta distress n labor are sensitivity 23.14%, specificity 12.66%, positive predictive value 28.87 %and negative predictive value of 9.71% Similarly predictability of abnormal NST for APGAR <6 are sensitivity 85.95. specificity 2658. positive predictive value 64.20 and NPV- 55.26

LBW had sensitivity 90.08, specificity 17.72, PPV 62.64 and NPV 53.85. NICU admission in non-reactive NST pattern found out to have sensitivity 51.24, specificity 32.91, PPV- 53.91 and NPV-30.59. In meconium stained liqour, sensitivity 6.61, specificity 88.61, PPV-47.06, NPV 38.25, perinatal death. Sensitivity -0.83, specificity 93.67, PPV-16.67, NPV-38.14. Combined together, sensitivity 42.97%, specificity 45.35%, PPV-45.54%, negative predictive value-37.63%.

Predictability of low AFI values for fetal distress are sensitivity 45.88, specificity 36.67, PPV-80.41, NPV-10.68. Predictability of AFI <5 for APGAR <6 are sensitivity 82.94, specificity 30%e, PPV 87.04, NPV-23.68, Similarly low birth weight < 2 kgs, predictability of low AFI for B.cot are sensitivity 90.00, specificity 30, PPV-87.93 and negative predictive value 34.62% Predictability of less AFI for NICU admission sensitivity 56.47 specificity 36.67, PPV-83 48 and NPV-12.99 and for meconium staining of liquour. Sensitivity 8.24. specificity 90. 00 PPV 82,35, NPV-14.75, perinatal death sen1.76, spec-90.00, PPV-50.00, NPV-13.92 And cumulative sensitivity- 4O.88, specificity 52.22 PPV 78.53, NPV - 18.43 When both the factors i.e., AFI and NST are considered i.e. AFI <9cm and non-reactive NST pattern out of 200, total 10 patients fall into this. category When mode of delivery is Compared all ten had caesarean section. 100% had fetal distress, 4 patients had APGAR 6(40%). 5 patients have birth weight 2 kg (50%) one had NICU admission (10%) 2 had meconium stained liquour (20%) and 2 had perinatal death (33.33%) Correlation of NST + AFI with perinatal outcome. Among the parameters deciding perinatal outcome fetal distress was present in 10(100%), APGAR K6 in 4 (40%), but <2 kg 5 (50%) NICU admission in 1(10%), meconium stained liquour in 2 (20%) and perinatal death in 2 (20%) and correlation of NST+AFI with fetal distress L.B.W, NICU admission, perinatal death was stastically significant. In the study shows the predictability of modified biophysical profile with the perinatal outcome. The sensitivity, specificity, positive predictive value and negative predictive value for individual parameter are as follows Fetal distress 45.79, 0.00 89.69, 0.00 respectively. PPV is


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more when compared to NST and AF individually APGAR< 6, values are 82.11, 40, 96.30, 10.53. sensitivity is almost similar. But PPV increased n NICU admissions values are 55 79. 10. 92.17, 1.18. PPV is increased, but NPV is decreased. When birth weight of child considered, it comes to 88.95. 50, 97.13. 19.23. Hence, sensitivity increased, PPV increased, Meconium staining is compared sensitivity, specificity, PPV NPV are 78.9, 80, 88.24, 4.37 respectively t has low When all 6 parameters are combined and averages taken. Sensitivity 411% Specificity 43.33%, PPV 88.36%, NPV 6.57% Hence, when the averages of sensitivity remain same, specificity increase. PPV is increased, NPV is decreased sensitivity and NPV, PPV is increased. Perinatal death is considered, values are 2.11 80, 66.67, 4.12. This also has low sensitivity and NPV PPV is increased.

High specificity and positive predictive value Imply that it is a reliable diagnostic test for assessing fetal well being, as a negative or reactive test is unlikely to be associated with adverse perinatal outcome.[4] On the other hand, lesser sensitivity and NPV imply that is relatively less reliable as a screening test for in identifying a compromised fetus as a Nonreactive fetus, needs further evaluation for confirming fetal compromise. When compared with other studies work of Eden et al,[5] shows decreased AFI had unsatisfactory perinatal outcome hence, NST has to be added which is in comparison with the present study. t shows that when AFI is considered alone, the predictability of perinatal.

Anjum et al,[6] showed predictability of AFI in term of mortality sensitivity 100.00%, specificity 80.61%, positive predictive value (PPV) 9.52%, negative predictive value (NPV) 100.00%. Eden et al also found 5.94% of perinatal mortalities in their study.[7] Predictability of NST in term of mortality was as sensitivity 50.00%, specificity 44.90%, positive predictive value (PPV) 1.82%, and negative predictive value (NPV) 97.78%. Diagnostic accuracy (sensitivity) was improved when NST and AFI both were combined. Diagnostic power (positive predictive value) was maximum seen with NST i.e. 76.36% (61.90% for AFI and 71.64% for combined MBPP)

Outcome is low, ie., comparison with individual factors of perinatal outcome are statically less significant than those in comparison of NST In the work done by Atul K. Sood and sanjay singh,[7] sensitivity of MBPP is less compared to present study and PPV for perinatal death is higher in the present study. According to Bardakci M,[8] difference in sensitivity, specificity, PPV, NPV. When AFI and NST are considered individually' and compared with that of modified biophysical profile, sensitivity increased, specificity decreased, PPV increased, NPV decreased in the present study, sensitivity remained same, specificity decreased, PPV increased, NPV deceased in modified BPP. Hence, the results are almost similar.

Hardik Amin,[9] showed round 58% participants of high-risk group and 82% of low-risk group had 'reactive' and NST tracings respectively. Almost 36% participants of high-risk group and 16% of low-risk group were delivered baby by LSCS method. Around 24% participants of high-risk group and 10% of low-risk group had meconium-stained amniotic fluid. Around 66% babies of participants of high-risk group and 24% of low-risk group were admitted in NICU.

A study done by Himabindu et al,[10] noted the sensitivity, specificity, PPV, NPV of NST test was 82.3%, 80.7%, 46.6%, 95.7% respectively. Biswas et al,[11] noted the sensitivity, specificity, PPV, NPV of NST test was 72.7%, 72.7%, 30.7%, 94.1% respectively in their study. In the study by Mehta et al,[12] the sensitivity, specificity, PPV, NPV of NST test was 67.6%, 80.8%, 90.9%, 46.5% respectively. Vermal et al,[13] found the sensitivity, specificity, PPV, NPV of NST test was 76%, 60%, 55.8%, 62.5% respectively.Our results were comparable with study done by Chaudhary et al,[14] (sensitivity 50%,specificity 86.3%, PPP 38.3%, NPV 92.6%).

**Limitations of Study:** Sample size relatively small Fetal or neonatal acidemia by fetal scalp blood umbilical artery blood sampling was not studied as an outcome measure as the facility for the same was not available.

## CONCLUSION

In predictability of perinatal outcome by MBPP positive predictive value is high which indicates it is a reliable diagnostic technique to predict the positive outcome of the fetus. If MBPP is negative it does not imply fetus is compromised. MBPP is a best, non-invasive screening technique to evaluate the perinatal outcome comparing to other methods like BPP which is time consuming, and requires a skilled personnel.

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