DOI -10.21276/obgyn.2025.v12.i1.35 *ISSN Print – 2454-2334; ISSN Online – 2454-2342*

RESEARCH ARTICLE

Comparative study of modified biophysical profile and its outcome in pregnancy before and after 40 weeks of gestation

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ABSTRACT

Objectives: To know the validity of modified biophysical profile in predicting fetal outcome before and after 40 weeks of gestation. **Materials and methods**: A prospective comparative study was done at Al-Ameen Medical College and Hospital, Vijayapur including 200 low risk patients, in which 100 patients are <40 weeks and 100 patients >40 weeks of gestation. Modified biophysical profile was done that is NST (for 20 mins) and AFI (by ultrasonography). Perinatal outcome was followed up with the help of Apgar score, birth weight, NICU admission, mode of delivery. **Result:** NST was nonreactive in 29% in >40 weeks group as opposed to 16% in <40 weeks group and oligohydramnios was in 12% in >40 weeks group as compared to the 3% incidence in <40 weeks group. LSCS rate was 49% in >40 weeks group compared to 38% in <40 weeks group. Apgar score and NICU admissions were not much different because of early detection of fetal distress and early intervention. **Conclusion**: Postdated pregnancies have more perinatal morbidity and mortality. MBPP is a good method to perform fetal surveillance in low risk pregnancies, So that unnecessary fetal compromise can be prevented therewith and better fetal outcome can be achieved.

Keywords: MBPP, NST, AFI, postdated pregnancy.

Abnormal uterine bleeding (AUB) is defined as any variation from the normal menstrual cycle, including changes in regularity and frequency of menses, in duration of flow, or in amount of blood loss. It is just a symptom not a disease.[1] More than 70% of all gynecological consultations in the peri and postmenopausal age group is due to AUB.[2] It occurs in various forms such as menorrhagia, polymenorrhagia, metrorrhagia, and menometrorrhagia.

Dysfunctional uterine bleeding (DUB) is defined as excessive bleeding (excessively heavy, prolonged or frequent) of uterine origin which is not due to demonstrable pelvic disease, complications of pregnancy or systemic disease.[3, 4] It accounts for approximately 50% of all cases and is ovulatory in almost 80% of cases.[5,6]

Pregnancy as a high risk event was first recognized in 1901 by Ballantyne in his paper titled "A plea for prematernity hospital."[1] The aim of every obstetrician is to ensure that mother and foetus get the best prenatal care, to ensure labour and delivery is accomplished without complications and that should intervention be needed, it is done quickly and safely. Unexpected antepartum foetal demise remains one of the most tragic complications of pregnancy. The process of birth is the most dangerous journey an individual undertakes.[2]

In India, about 0.75 million neonates die every year, the highest for any country in the world. The current perinatal mortality rate of India (2013) is 26 per 1000 births. It ranges from 16 per 1000 births in urban areas to 28 per 1000 births in rural areas.[3]

With the advent of modern medicine, many techniques have been invented to assure fetal wellbeing or to identify potential fetal jeopardy during antenatal period itself so that the screening can be done on time. The screening will help prevent perinatal mortality and morbidity.

Received: 4th October 2022, Peer review completed: 14th May 2023, Accepted: 7th June 2024.

Deshpande GR, Vidya AT, Quadri FZ. Comparative study of modified biophysical profile and its outcome in pregnancy before and after 40 weeks of gestation. The New Indian Journal of OBGYN. 2025; 12(1): 188-92.

Modified biophysical profile is an easy, non-invasive, affordable, accessible test with no contraindications for pregnancy for antenatal fetal surveillance. It includes NST (non stress test) and ultrasonic assessment of liquor volume.

Beyond 40 weeks of gestation many complications occur in pregnancy like the oligohydramnios (AFI <5), fetal distress at the time of labour. Hence timely screening in such cases can help prevent fetal demise and morbidity. Hence this study intends to know the validity of modified biophysical profile in predicting fetal outcome before and after 40 weeks of gestation.

Materials and methods

It's a prospective comparative study was conducted among 200 cases in which 100 patients are <40 weeks and 100 patients >40 weeks of gestation who attended OPD of OBG Department of Al Ameen Medical College Hospital, Vijayapura, India during the period of November 2019 to November 2021.

Inclusion criteria

1. Singleton pregnancy
2. Cephalic presentation
3. No congenital abnormality
4. Gestational age more than 37 weeks of gestation.

Exclusion criteria

- Congenital abnormality
- Less than 37 weeks of gestation
- CPD
- Malpresentation
- Previous two or more CS
- High risk pregnancy like PIH, DM, Cardiac abnormality.

Research tool -

The modified biophysical profile was performed -

NST - Reactive: When 2 or more accelerations are positive for > 15 beats lasting for > 15 secs; Nonreactive: When no acceleration in 20 mins or loss of beat to beat variability or presence of spontaneous decelerations.

AFI - Then a four quadrant amniotic fluid was assessed, sum of less than or equal to 5 cms, or more than or equal to 25 cms was considered as abnormal.

The babies were examined immediately after birth and following factors were noted -

1. Mode of delivery
2. Birth weight
3. Apgar scoring
4. NICU admission

Statistical analysis: The data collected in the present study is analyzed statistically by computing the descriptive statistics viz., Mean, SD, Percentages and 95% confidence interval for all continuous variables. The data is presented in the form of tables and graphs. The difference in mean is tested using independent sample student's t-test and the measures of association between the qualitative variables are assessed using chi-square tests. The inference is considered statistically significant whenever $p \leq 0.1$.

Results

The maximum number of cases belonged to age group 21 – 25 years, comprising 61% and 54% each in <40 and >40 weeks respectively. 7% and 12% cases belonged to ≤ 20 weeks in <40 and >40 weeks respectively. 25% in each group belonged to 26 – 30 yrs. 7% and 9% cases belonged to ≥ 31 weeks respectively (table 1).

Table 1: Distribution of age according to gestation

Age (Yrs)	Gestational age (Weeks)		Total
	≤40	>40	
≤20	7	12	19
21-25	61	54	115
26-30	25	25	50
≥31	7	9	16
Total	100	100	200

Maximum patients were of middle class comprising of 56% and 58% each in <40 and >40 weeks respectively ($\chi 2$=0.08508, p 0.9583), only 3 % in each group belonged to the upper class. While 41% and 39% belonged to lower class in <40 and >40 weeks respectively (table 2). All the cases taken in the study were booked. Primipara comprised of 30% and 43% with multipara comprising 70% and 57% in <40 and >40 weeks groups respectively and it was significant (p = 0.05621).

Table 1: Distribution of age according to gestation

Age (Yrs)	Gestational age (Weeks)		Total
	≤40	>40	
≤20	7	12	19
21-25	61	54	115
26-30	25	25	50
≥31	7	9	16
Total	100	100	200

NST was nonreactive in 16% and reactive in 84% in <40 weeks group and was nonreactive in 29% and reactive in 71% in >40 weeks gestation group. Hence reflecting more non-reactive NST in >40 weeks group. And the difference was statistically very significant (table 3).

Table 3: Distribution of NST

NST	Gestational age (Weeks)		Total	Chi-Square	Df	P Value
	≤40	>40				
Nonreactive	16	29	45	0.8458	1	0.02771
Reactive	84	71	155			
Total	100	100	200			

In <40 weeks gestation group, 57% patients had a normal full term delivery, 38% had LSCS, 5% had VBAC, and no forceps delivery. In >40 weeks group, 47% patients had a

normal full term delivery, 49% had LSCS, 3% had VBAC and only 1% had a forceps delivery.

Table 4: Correlation of AFI with mode of delivery

AFI	Normal delivery	LSCS	VBAC	Forceps	Total
Gestational age ≤40 weeks					
0-5	0	3	0	0	3
5.1-8	14	4	0	0	18
>8.1	43	31	5	0	79
Total	57	38	5	0	100
Gestational age >40 weeks					
0-5	1	11	0	0	12
5.1-8	12	5	1	0	18
>8.1	34	33	2	1	70
Total	47	49	3	1	100

As shown in the table 4, lesser the AFI more the patients underwent LSCS. Lesser AFI is related more with >40 weeks group, 12% had AFI <5 and out of those 1% only delivered normally, rest 11% underwent LSCS as compared to <40 weeks group, wherein only 3% had AFI <5 and underwent LSCS.

Table 5: Descriptive and inferential statistics of Apgar at 1 minute

Apgar at 1 minute	Gestational age ≤40 weeks			Gestational age >40 weeks		
	No. of cases	Mean	SD	No. of cases	Mean	SD
<5	2	0	0	1	2	-
5-6	11	5.81	0.404	14	5.78	0.425
7-8	87	7.05	0.234	85	7.08	0.276
Total	100	6.78	1.078	100	6.85	0.729
Apgar at 5 minute						
<5	2	0	0	1	3	-
5-6	0	0	-	1	6	-
7-8	91	7.93	0.249	91	7.879	0.327
9-10	7	9	0	7	9	0
Total	100	7.85	1.183	100	7.89	0.68

Apgar at 1 min was <5 in 2% and 1% in <40 weeks and >40 weeks respectively. 5-6 in 11% and 14% in <40 weeks and >40 weeks respectively. 7-8 in 87% and 85% in <40 weeks and >40 weeks respectively. Apgar at 5 mins was almost same in both the groups maybe because of early detection and intervention in our hospital. Apgar was <5 in 2% and 1%, 5-6 in 0% and 1%, 7-8 in 91% in each group, 9-10 in 7% in each group in <40 and >40 weeks respectively (table 5).

Table 6: Distribution of NST and AFI

AFI	NST					
	Gestational age ≤40 weeks			Gestational age >40 weeks		
	Nonreactive	Reactive	Total	Nonreactive	Reactive	Total
0-5	3	0	3	11	1	12
5.1-8	2	16	18	2	18	20
>8.1	11	68	79	16	52	68
Total	16	84	100	29	71	100

As evident from the table 6, as gestational age increased more the decreased AFI and more the nonreactive NSTs. 3% patients in <40 weeks group had AFI <5 cm and nonreactive NST, compared to >40 weeks group where 11% had nonreactive NST with AFI <5 cm.

Table 7: NICU admission

NICU admission	Gestational age (weeks)		Total	Chi-Square	Df	P value
	≤40	>40				
Not admitted	97	96	193	0.148	1	0.7004
Admitted	3	4	7			
Total	100	100	200			

Table 8: Birth weight

Birth weight (kgs)	Gestational age ≤40 weeks			Gestational age >40 weeks		
	No. of cases	Mean	SD	No. of cases	Mean	SD
Unrecorded	4			5		
<2.5	16	2.025	0.211	11	2.009	0.25
2.5-2.9	21	2.6	0.144	20	2.59	0.12
3.0-3.4	49	3.048	0.115	50	3.068	0.14
3.5-3.9	10	3.56	0.084	9	3.544	0.072
>3.9	0	-	-	5	4	0
Total	100	2.833	0.469	100	2.938	0.501

As it is evident table 7, only 3% and 4% of the babies were admitted in NICU from <40 weeks and >40 weeks groups maybe because of early detection of fetal distress and early intervention. 97% and 96% babies were not admitted in <40 weeks and >40 weeks groups. The difference was insignificant statistically.

Only 5 of the babies born had birth weight more than 3.9 kg in the present study, and all of them belonged to >40 weeks group comprising of 5% of cases of this group. In 4% and 5% cases, the birth weight was not recorded , <2.5 kg in 16% and 11% cases, 2.5 – 2.9 kg in 21% and 20% cases, 3-3.4 kg in 49% and 50% cases, 3.5-3.9 kg in 10% and 9% cases in <40 and >40 weeks group respectively (table 8).

Discussion

In the present study, maximum that is 54% of the postdated patients have been of 21-25 yrs age group compared to Narayan R et al [4] study in which most 37% of postdated women belonged to 21-24 yrs age group and Gupta M et al[5] study wherein 85.3% of postdated patients belonged to 21 - 35 yrs age group. In study done by Narayan R et al[4], 44% cases were booked whilst 56% of the postdated cases were unbooked among the postdated patients studied as opposed to our study in which all of the postdated cases were booked. In this study postdated primipara comprised of 43% only. However, in the studies executed by Bhriegu et al[6] and Mahapatro et al[7] there have been 62% and 71% primigravidas respectively which was greater compared to our study.

In present study, 16 (16%) and 29 (29%) patients showed abnormal NST outcomes in < 40 and > 40 weeks group respectively and in study by Guidetti and Divon[8], 4 (6.77%) and 34 (24.46%) patients showed abnormal NST outcomes in < 40 and > 40 weeks groups respectively. From both the studies, it was observed that patients with > 40 weeks POG had greater number of patients with abnormal NST outcomes compared to< 40 weeks POG. In study conducted by Lohana RU et al [9] in gestation age >40 weeks the nonreactive NST accounted for 66.66% of the cases. Hence in all these studies it is justified that postdatism is associated with greater fetal distress and hence the nonreactive NSTs.

In the present study in>40 weeks group, 12% compared to<40 weeks group, wherein only 3% had oligohydramnios. In study by Guidetti and Divon [8] 0% cases in <40 wks group and in>40 weeks group, 13.66% had oligohydramnios and was nearly corresponding to the existing study. Whereas in the studies carried out by Mahapatro [7]and Alexander et al [10] it is 16.7% and 14 % respectively in >40 weeks,

In our study the rate of caesarean delivered in >40 weeks group turned into 49%. The cesarean section rate in studies carried out by Dobriya et al[11] (32.14%) and Bhriegu et al[6] (34%) respectively. It is comparable with study carried out by Narayan R et al[4] (45%). This high LSCS rate can be due to early detection of fetal distress and early decision of LSCS in our hospital. In our study the rate of LSCS was more in >40 weeks (49%) as compared to <40 weeks group (38%). In present study the rate of instrumental deliveries was 1% in postdated group and in Bhreigu et al[6] it was 2%. Whereas the rate of instrumental delivery turned into 5.72% in the study done by Mahapatro[7] which was greater compared to our study.

In present study, Apgar at 1 min was <5 in 2% and 1% in <40 weeks and >40 weeks respectively. 5-6 in 11% and 14% in <40 weeks and >40 weeks respectively. 7-8 in 87% and 85% in <40 weeks and > 40 weeks respectively. Whereas in study performed by Punya BS et al[12], Apgar score < 8 at 1 minute was 13.5% in <40 weeks, 31.3% in 40-41 weeks and 66% in >41 weeks respectively. Apgar score of <8 at 5 minutes was, 7.2% in <40 weeks, 21.1% in 40-41 weeks, 50% in >41 weeks respectively.

In the present study, only 3% and 4% of the babies have been admitted in NICU from <40 weeks and >40 weeks groups perhaps due to early detection of fetal distress and early intervention. The distinction was insignificant statistically. Whereas in study performed by Narayana R et al[4], 42% of the postdated babies have been admitted to NICU. In study performed by Punya BS et al[12], admission to NICU was 9.7% in <40 weeks, 23.8% in 40-41 weeks, 52% in >41 weeks. In study by Gupta M et al[5] in postdated group the NICU admission rate was 26.7% which turned into very high as in comparison to the present study.

Only 5 of the babies born had birth weight greater than 3.9 kg in the present study, and all of them belonged to >40 wks group comprising of 5% of cases of this group as in comparison to the study executed by Gupta M et al[5], wherein 21.3% birth weight turned into >3.5kg.

Hence from the present study it is justified that MBPP is a great tool for detecting fetal distress on time in uncomplicated pregnancies both term and postdated. However the Apgar score and NICU admission rate was not much exclusive in each the groups due to early detection of fetal distress via way of means of MBPP and early decision of termination of pregnancy by LSCS.

Conclusion

From the present study it is evident that NST was nonreactive in 16% and reactive in 84% in <40 weeks group and was nonreactive in 29% and reactive in 71% in >40 weeks gestation group. Hence reflecting more nonreactive NST in >40 weeks group. In the study, lesser AFI is related more with >40 weeks group, 12% had AFI <5 and out of those 1% only delivered normally, rest 11% underwent LSCS as compared to <40 weeks group, wherein only 3% had AFI <5 and underwent LSCS.

In <40 weeks gestation group, 57% patients had a normal full term delivery, 38% had LSCS, 5% had VBAC. In >40 weeks group, 47% patients had a normal full term delivery, 49% had LSCS, 3% had VBAC and only 1% had a forceps delivery. Hence in the present study we conclude that postdated pregnancy has its complications on the fetus and it can be detected on time with the help of MBPP to get a better neonatal outcome.

Acknowledgement: We thank all the patients who gave their consent and participated in our study and to all our colleagues of Department of OBG of Al-Ameen Medical College, Vijayapura, for their support and help during the study.

Conflict of interest: None. **Disclaimer:** Nil.

References

1. Ballantyne JW. A plea for a promaternity hospital. British Med Journal. 1901; 1: 813- 19.

2. Gibb D. Foetal Monitoring in Practice: Clinical Assessment and Practice. 11th ed. Netherlands: Elsevier; 2000.
3. Registrar General of India, Sample Registration System. Statistical Report 2013. New Delhi: Registrar General of India, Sample Registration System; 2013.
4. Narayan R, Sheela SR. A cross sectional observational study to evaluate the maternal and Fetal outcome in postdated pregnancies. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2021 Jan 1;10(1):159-64.
5. Gupta M, Shrivastava S, Rai S. To study the maternal and fetal outcome in pregnancy beyond 40 weeks. Int J Clin Obstet Gynaecol. 2020; 4(2):123-9.
6. Bhriegu R, Agrawal M, Hariharan C. Assessment of maternal and perinatal outcome in postdated pregnancy. Journal of Datta Meghe Institute of Medical Sciences University. 2017 Jan 1; 12(1): 35.
7. Mahapatro AK, Samal S. Fetomaternal outcome in pregnancy beyond 40 weeks. Int J Pharm Bio Sci. 2015; 6(2): 53-8.
8. Guidetti DA, Divon MY, Langer O. Postdate fetal surveillance: is 41 weeks too early?. American journal of obstetrics and gynecology. 1989; 161(1): 91-3.
9. Lohana RU, Khatri M, Hariharan C. Correlation of non stress test with fetal outcome in term pregnancy (37-42 Weeks). International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2013 Dec 1; 2(4): 639-46.
10. Alexander, JM, Mclntire DD, Leveno KJ. Forty weeks and beyond: pregnancy outcomes by week of gestation. Obstetrics and Gynaecology. 2000; 96(2): 291-4.
11. Dobariya PV, Shah PT, Ganatra HK. Fetomaternal outcome in pregnancy beyond 40 weeks. Int Repord contracept obstet gynaecol. 2017; 6: 527-31.
12. Punya BS, Sailakshmi MP. Study of post dated and term pregnancy with fetomaternal outcome at RRMCH. Indian Journal of Obstetrics and Gynecology Research. 2017; 4(2):179-83.

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