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Low resource setting- The need of Non-Stress Test and Early Amniotomy in Low risk and High-risk pregnancy

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Abstract:
Background: *Normal labour continues to be an obstetrical enigma. It is a test of time for the mother, the fetus and the obstetrician. The primary purpose of the fetal surveillance is to detect fetal hypoxia and acidosis which are the common causes of fetal death and to possibly avoid perinatal morbidity and mortality. antepartum surveillance with NST reduced the perinatal mortality in the tested population of high risk pregnant patients. The stillbirth rate in tested population was twice as low in non-tested population. An Early Amniotomy (EA) in the latent phase of the labour, a procedure first introduced by O'Driscoll et al in 1969 as a component of the active management of labour.*
Materials and Methods: *This hospital based prospective observational study was conducted at the Department of Gynaecology and Obstetrics at Jawaharlal Nehru Hospital & Research Centre, Bhilai, Chhattisgarh from January 2016 to June 2017.The patients who fulfilled the inclusion criteria after informed consent formed the study population, were further distributed in low risk and high risk group with 200 patients in each group. A total of 939 NST's were performed on the patients. Based on the NST patterns the patients were monitored further.*
Results: *Majority of the patients were primigravida (60.55%). The mean age of gestation was 39.29±0.96 and 38.78±1.35weeks in low risk and high risk group respectively. When compared in low risk and high risk group the NST was found to be statistically non-significant(p-value=0.1786). In low risk group 66.15% of patients had meconium stained liquor on early amniotomy. Reassuring NST was found to be a good predictor of duration of NICU stay favourable neonatal outcome in both the groups.*
Conclusion: *We did not find any significant difference in the results of the NST between women with low risk and high risk pregnancy. But this test is a promising basic screening tool in pregnancy to assess fetal well-being.*
Keywords: *NST, High risk group, Low risk group, Early amniotomy*

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I. Introduction

The era of 21st century is the era of advances, era of technologies of utmost precision, that have helped to think the impossible and do the unthinkable. But with such precise technologies there still are some phenomenon of science that continue to enthral us. One such phenomenon is *'NORMAL LABOUR.'*

Normal labour continues to be an obstetrical enigma. It is a test of time for the mother, the fetus and the obstetrician.

With our little understanding we have been able to achieve an appreciable reduction of maternal morbidity and mortality.[1]

But India has the unfortunate distinction of claiming more than a quarter of the total new-born death in the world[2]. The addition of any maternal high risk and/or fetal high risk makes the condition more susceptible for adverse outcome. Nearly 70-90% of all fetal deaths occur before the onset of the labour. Based on various data available, approximately 30% of antepartum fetal deaths may be attributed to asphyxia (like IUGR, placental hypermaturity, prolonged gestation), 30% to maternal complications (pre-eclampsia, abruptio-placentae, diabetes mellitus), 15% to congenital malformations and chromosomal abnormalities and 5% to infections. As with time the focus of the obstetrician has shifted from being a care provider not only for the mother but for the fetus as a patient too[3].

Whereas we can directly evaluate the mother, it has always been a task to assess the growing fetus. The fetal well-being can be assessed with the most simplest of the ways like Daily Fetal Movement Count(DFMC),

to the most recent 3-D&4-D ultrasonography. But what is important is to monitor the patient from admission to being discharged with a simple, most non-invasive, cheap and reliable method.

One such invention has been the Non-Stress Test(NST). From its invention in 1975to the present day it continues to monitor the fetal heart rate and its patterns. It is a simple bed side test which describes the fetal heart rate acceleration in response to fetal movements as a sign of fetal health.[4]The acceleration of fetal heart rate associated with fetal movements are presumably reflex mediated and it gives the real time fetal heart rate(FHR).[5]

The primary purpose of the fetal surveillance is to detect fetal hypoxia and acidosis which are the common causes of fetal death and to possibly avoid perinatal morbidity and mortality. Henceforth NST has been accepted as a primary surveillance for high risk pregnancies.[3]

A decade long study from 1974-1983 showed that antepartum surveillance with NST reduced the perinatal mortality to 11.8/1000 in the tested population of high risk pregnant patients. The stillbirth rate in tested population was twice as low in non-tested population which was found to be 11.1/1000, on correction for congenital anomalies the still birth rate was 2.2/1000 in the tested high risk population.[3]

Is it only the high risk pregnancies that need fetal monitoring? Is NST a test enough to predict the fetal well-being? Can a Non-reassuring(NR) or an Abnormal(Ab) NST be the basis to expedite the delivery?

Another important aspect of this study is to perform an Early Amniotomy(EA) in the latent phase of the labour, a procedure first introduced by O'Driscoll et al in 1969 as a component of the active management of labour.[6]

In this study, NST was performed in patients belonging to both the low risk and high risk group on admission and repeated in both the groups, in patients with non-reassuring or abnormal NST,[7] early amniotomy was done to identify the high risk factors in low risk group and to intervene timely with the measures to improve the neonatal outcome in both the groups.

Thus, the present study is an attempt to observe the NST as an admission test, for monitoring patients in labour and to timely intervene with early amniotomy to improve the take home rate of healthy babies in both the groups, as each pregnancy either low risk or high risk demands utmost attention and care to ensure both a healthy mother and a baby at the end of the journey called '*labour'.*

II. Materials And Methods

This prospective observational study was carried out in the Department Gynaecology and Obstetrics at Jawaharlal Nehru Hospital & Research Centre, Bhilai after getting approval from Ethical committee of the institution. The study was done over a period of 18 months, from January 2016 to June 2017.

Study Design: Hospital based prospective observational study.

Study Location: Jawaharlal Nehru Hospital & Research Centre, Bhilai, Chhattisgarh.

Study Duration: From January 2016 to June 2017.

Sample Size: 400 antenatal mothers, divided into low risk group and high risk group each containing 200 mothers.

Sample size calculation: Sample size will be calculated by Cochran's formula for sensitivity analysis

SENSITIVITY				
SN	**Z**	**E**	**SN(1-SN)**	$\boldsymbol{Z^2(\frac{SN(1-SN)}{E^2})}$
92.31%	1.96	0.05	0.071	110

SN= SENSITIVITY OF NST-NICU admission (from previous study, here 92.31%)

E= PRECISION, USUALLY 5% i.e. 0.05

Z=1.96, Z VALUE FOR 5% CONFIDENCE LEVEL

SAMPLE SIZE N= $Z^2(\frac{SN(1-SN)}{E^2})$

=110 samples

To increase the power of the study a sample size of 400 samples has been considered for this study.

Selection method: The patients on admission based on a detailed history with respect to past and/or present medical or surgical history, menstrual history and past and/or present obstetrical history were allocated to low risk and high risk groups. A total of 400 patients, with 200 in each group with best possible match in relation to age and parity were taken in to consideration.

Babies were delivered vaginally, by instrumental delivery like forceps, or by caesarean section, keeping in mind the best possible outcome. Babies were followed up and taken into consideration in analysing the perinatal outcome.

INCLUSION CRITERIA-

- Patients with >34 weeks of pregnancy with pain or in latent phase of labour. The elective delivery will be managed at our hospital irrespective of age group, ANC status gravidity and parity.
- Pregnant women with no associated risk factor and/or not falling under exclusion criteria will be included in low risk group(LRG).
- Pregnant women with one or more risk factor and/or not falling under exclusion criteria will be included in high risk group(HRG).
- Abnormal admission NST/CTG in low risk group will be included in high risk group.
- Any maternal medical condition e.g, malnutrition, anaemia, chronic hypertension, seizure, cardiac disease, diabetes, STD's, genetic disorders, hemoglobinopathies, antibody mediated disorders etc that place pregnancy at risk of poor outcome.[3]
- Obstetrical high risk factors like IUGR, oligohydramnios, poor doppler changes, prior preterm birth, premature rupture of membranes, prior neonatal deaths etc.[3]

EXCLUSION CRITERIA-

- Patients with USG diagnosed congenital anomaly which will affect the fetal outcome irrespective of the management and mode of delivery.
- Patients in active phase of labour and/or about to deliver.
- Patients admitted with preterm labour pains.
- Patients with gestational age <34 weeks by dates(LMP)
- Patients with multiple pregnancies like twin pregnancy etc to increase the efficacy of the study.

III. METHODOLOGY

400 obstetric patients admitted in labour room, fulfilling the inclusion and exclusion criteria who gave informed consent were accordingly allocated to the low risk or high risk group.

Following the selection of cases a detailed history was written in words of patients and as obtained from the antenatal records and were noted in a printed proforma vide annexure. Patients underwent a careful general, systemic and obstetric examination, after localisation of fetal heart sound by stethoscope, the patient was subjected to admission Non-Stress Test using the AVALON FM-30, and HEWLETT PACKARD XM-10. Keeping in mind the basic principle of non-stress test, it was done as follows:

- NST was done in presence of a senior obstetrician, time taken for a NST is usually 20 minutes.
- But the test was stopped before if the criteria for Reactive/Reassuring(R)[8] was met before[9], but it was performed for a minimum of 10 minutes to determine the Baseline.
- It was performed with the mother being in left lateral or semi-fowler[10] or any position in which the mother was comfortable. Care to avoid supine hypotension was taken.
- After application of coupling gel the transducer was kept on the maternal abdomen to record the fetal rate and its pattern on a graph. The **Admission NST** thus obtained was categorised into Reassuring or Non-reassuring or Abnormal according to the NICE GUIDELINES 2017.[8]
- A REPEAT NST is usually performed after 3-4 hours after the admission test if the patient remained undelivered[11]. For the purpose of this study the NST was repeated after 8 hours. The NST was again categorised according to NICE guidelines of 2017. The Reassuring NST was monitored by intermittent auscultation and the progress of labour was monitored by WHO standardized Partograph in active stage of labour.
- If the Admission or repeat NST was found to be Non-reassuring/Abnormal then corrective measures (e.g. left lateral position, oral or intravenous fluids, and 100% oxygen). A senior obstetrician was informed, the patient and the relatives of the patient were also informed about the progress and changes that occurred.
- If the NST was Non-reassuring after corrective measures or Abnormal, then an early amniotomy was done. Since our hospital doesn't have the newer facilities like fetal scalp blood pH monitoring, umbilical cord blood sampling for pH and base measurements, patients with thin/thick liquor in early labour were delivered by caesarean section. Patients with thin/thick meconium in active labour with were given a trial of labour with CTG monitoring and after informed consent. Depending on the indications patients delivered either vaginally/ forceps/ LSCS.
- As soon as the baby was delivered, newborn care was performed according to the neonatal resuscitation algorithm 2010[12] along with the neonatologists.

STATISTICAL ANALYSIS-

The statistical analysis was done using SPSS (Statistical packages for Social Sciences) Version 16.0 software. The following Statistical formulas were used:

statistic	Formula
Sensitivity	$\frac{a}{a+b}$
Specificity	$\frac{d}{c+d}$
Positive Predictive Value	$\frac{a}{a+c}$
Negative Predictive Value	$\frac{d}{b+d}$

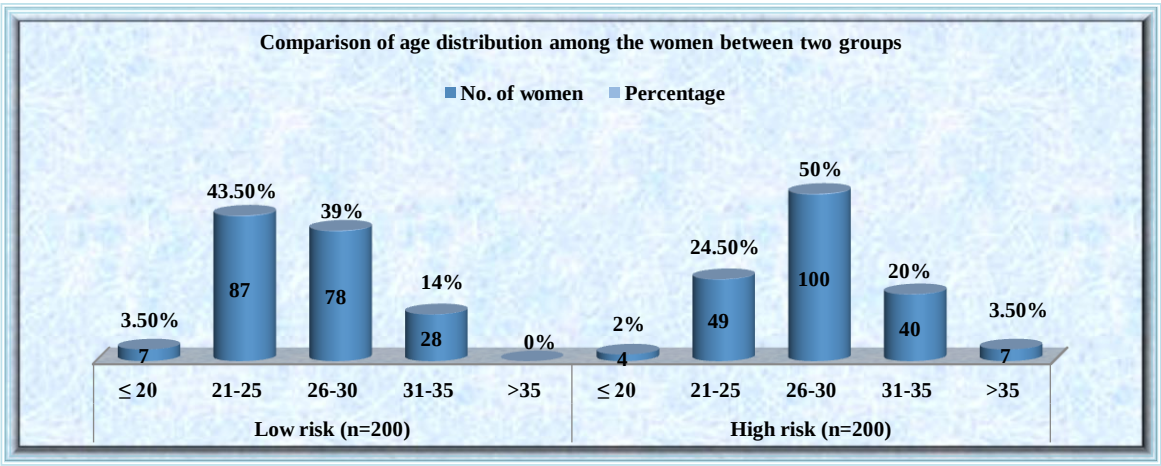
Where a=True positive b= false negative c= false positive d=true negative

IV. Results

939 NST's were conducted in 400 patients, each group consisting of 200 patients. Table 1 shows the age related demography finding of each group.

Table 1 Comparison of age distribution among the women between two groups

Age group (in years)	Low risk (n=200)		High risk (n=200)	
	No. of women	Percentage	No. of women	Percentage
≤ 20	7	3.5%	4	2%
21-25	87	43.5%	49	24.5%
26-30	78	39%	100	50%
31-35	28	14%	40	20%
>35	0	0%	7	3.5%

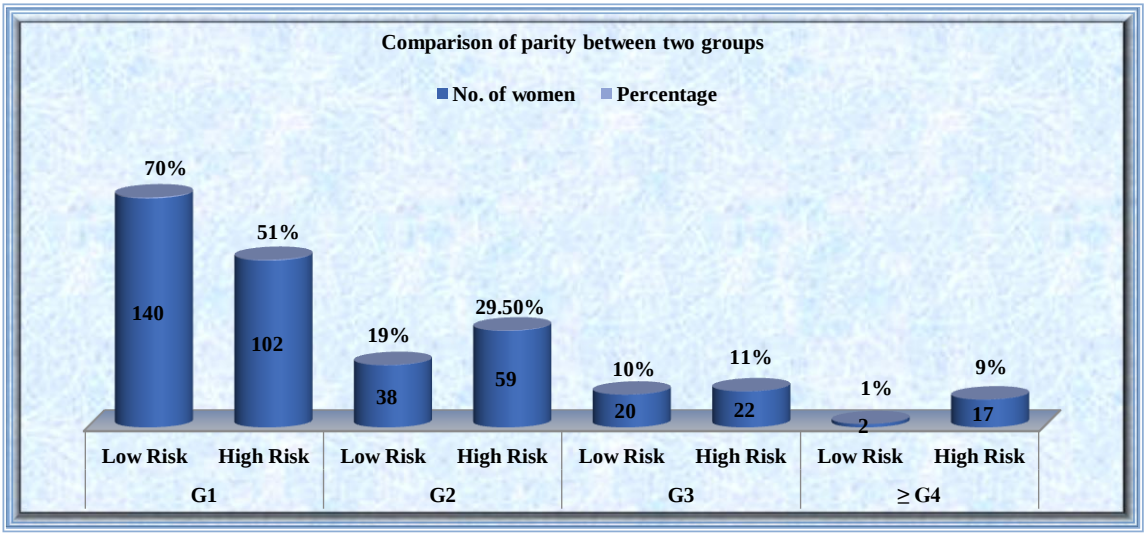


p-value= 0.0001 for low risk group between 21-25 years was observed. A p-value= 0.0346 for high risk group between 26-30 years was observed.

87 i.e. 43.5% of the patients in low risk group were between 21-25years, whereas 100 i.e. 50% of the high-risk patients were between 26-30 years. 3.5% of the patients in high risk group were more than 35 years of age, and was observed to be statistically significant. The mean age in low risk group was observed to be 26.23±3.63 and that for high risk pregnancy was observed to be 27.92±3.91 both the parameters were found to be statistically significant. In the present study 84.75% of the patients were booked. The unbooked status constituted 15.25% of the total patients included in the study.

Table 2 Comparison of obstetric history between two groups

Parity	Low Risk (n=200)		High Risk (n=200)	
	No. of women	Percentage	No. of women	Percentage
G_1	140	70%	102	51%
G_2	38	19%	59	29.5%
G_3	20	10%	22	11%
$\geq G_4$	2	1%	17	8.5%

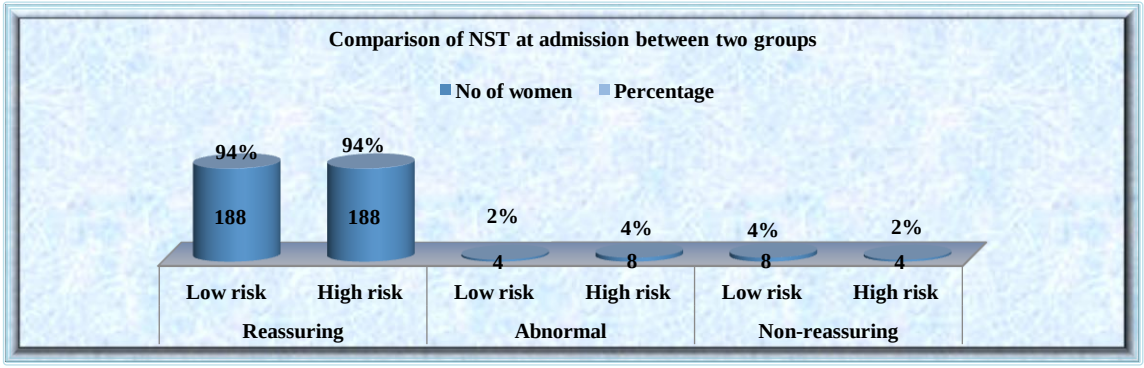


140 i.e.70% were primigravidae in low risk group, whereas only 51% were primigravidae in high risk group. 17i.e. 8.5% were 4th gravida in high risk group compared to 2 i.e. 1% in low risk group. This data was observed to be statistically significant in low risk and high risk pregnancy, as well as with the NST patterns.

Table 3 Comparison of NST at admission between two groups

NST at admission	Low risk (n=200)		High risk (n=200)	
	No of women	Percentage	No of women	Percentage
Reassuring	193	96.5%	186	93%
Abnormal	4	2%	9	4%
Non-reassuring	3	1.5%	5	2%

p-value was found to be >0.05 for all the NST parameters.



193 patients in low risk group i.e. 96.5% of the patients had reassuring NST compared to 186 i.e. 93% of patients in high risk group. 2% and 4% of the patients in low and high risk respectively had abnormal NST. The p-value was not found to be statistically significant. Repeat NST was done in 197 patients in low risk and 136 patients in high risk group. 167 (84.77%) in low risk group and 114(83.82%) had reassuring NST. Abnormal NST was seen in 7.61% and 11.76% of the patients in low risk and high risk respectively. No statistical significance was seen with Repeat NST in both the groups. In the low risk group, 117 i.e. 60.62% with

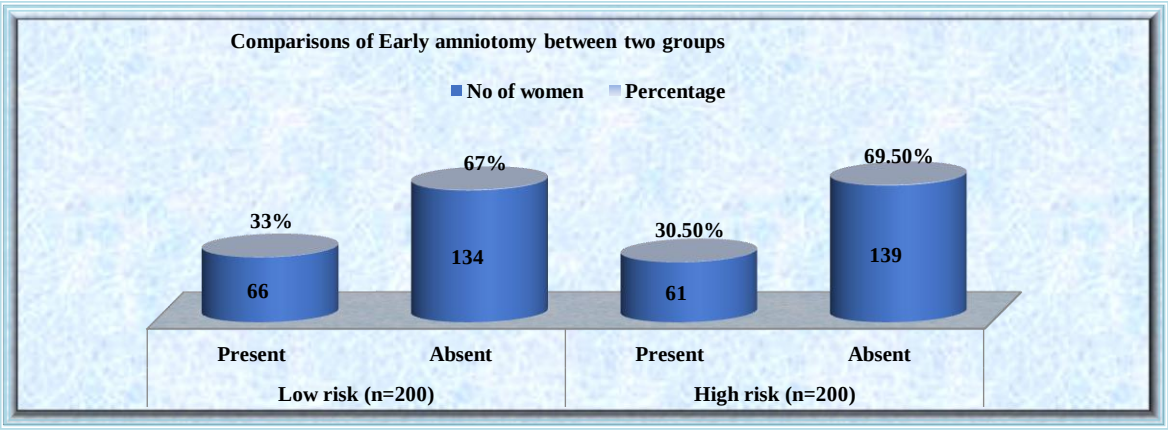
reassuring NST went in spontaneous labour, whereas in high risk group with reassuring NST only 14 i.e.7.49% patients went in spontaneous labour. 74i.e. 38.34% and 94 i.e. 50.54% of the patients in low risk and high risk group respectively were induced. With non-reassuring NST both in low risk and high risk group 4 i.e. 100% and 8 i.e. 100% respectively were not given a trial of labour. This was found to be highly significant statistically in both the groups.

In 103 i.e.51.5% patients in low risk group had spontaneous onset of labour, whereas in high risk group, only 14 i.e. 7% patients had spontaneous onset of labour. In low risk group 8 i.e. 4% were given no trial of labour, whereas in high risk group 91 i.e. 45.5% patients were not given any trial of labour.

Table 4 Shows the comparison of early amniotomy done in both the groups.

Early amniotomy	Low risk (n=200)		High risk (n=200)	
	No of women	Percentage	No of women	Percentage
Present	66	33%	61	30.5%
Absent	134	67%	139	69.5%

p-value= 0.6675



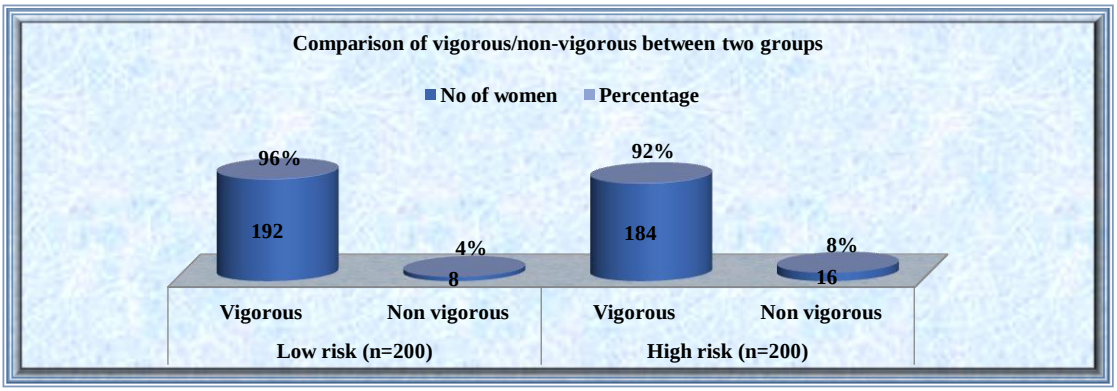
Early amniotomy was done in 66 i.e. 33% of the patients in low risk group and it was done in 61 i.e. 30.5% of patients in high risk group. The p- value didn't show any statistical significance for performing an early amniotomy in low risk or how risk group. In low risk group 66.15% of patients had meconium stained liquor on early amniotomy.

129 i.e. 64.5% patients delivered vaginally in low risk group, whereas 66 i.e. 33% delivered vaginally in high risk group. LSCS was done in 131 i.e. 65.5% of patients in high risk group which included elective as well as emergency LSCS, compared to 65 i.e. 32.5% in low risk group. In the low risk group the most common indication for LSCS was meconium in early labour with or without fetal distress. In high risk group the most common indication for LSCS was previous scar with or without labour.

Table 5 Shows the distribution of vigorous or non-vigorous baby in both the groups.

V/NV	Low risk (n=200)		High risk (n=200)	
	No of women	Percentage	No of women	Percentage
Vigorous	192	96%	184	92%
Non vigorous	8	4%	16	8%

p-value= 0.145

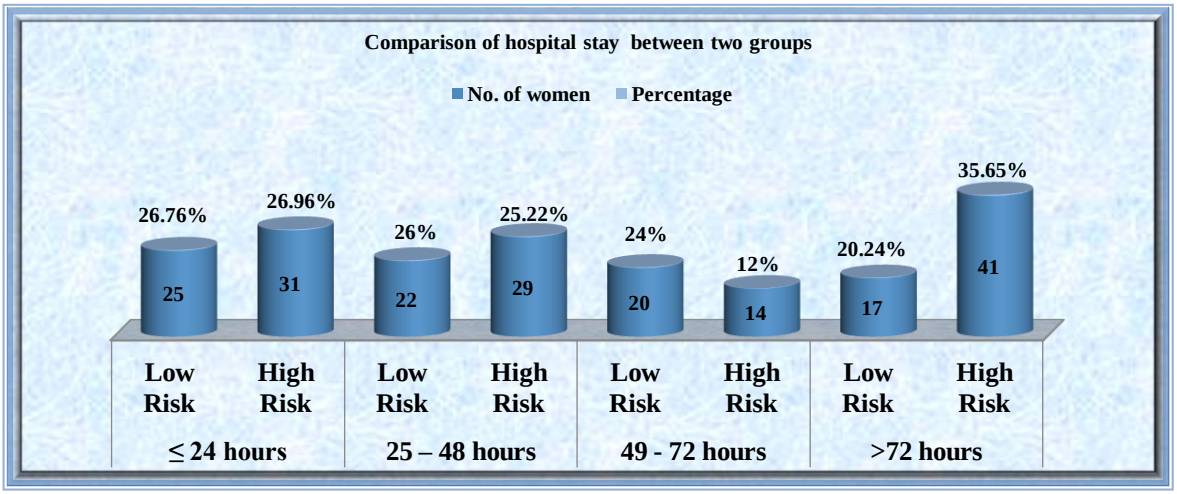


192 i.e. 96% of the patients in low risk group, had vigorous babies, whereas in high risk group, 184 i.e. 92% of the patients had vigorous babies. There was no statistical significance in both the groups. However, when the vigorous and non-vigorous were compared with the NST patterns they were observed to be statistically significant i.e. a p-value of <0.05.

Table 6 Shows the duration of NICU stay in both the groups.

NICU stay	Low risk (n=84)		High risk (n=115)		p-value
	No. of women	Percentage	No. of women	Percentage	
≤ 24 hours	25	26.76%	31	26.96%	0.8962
25 – 48 hours	22	26.19%	29	25.22%	0.9924
49 - 72 hours	20	23.81%	14	12.17%	0.0497*
>72 hours	17	20.24%	41	35.65%	0.1375

p-value=0.0497, for NICU stay of 49-72hours.



During their stay in the hospital, 84 babies born in the low risk group, were admitted and/or readmitted in the NICU, 17 i.e. 20.24 % babies stayed for >72 hours. 115 babies in the high group were admitted /or readmitted in the NICU, 41i.e. 35.65 % of the babies stayed for > 72 hours in NICU. p-value was found to be significant when the baby stayed for 49-72 hours in the NICU. However, when the NST patterns were compared with the duration of NICU stay, all the subgroups were found to be statistically significant.

Table 7 Shows the comparison of the statistical parameters in both the groups

Parameters	Low risk		High risk	
	Sensitivity	Positive predictive value	Sensitivity	Positive predictive value
NST with V/NV	96.79%	93.78%	92.97%	92.47%
NST with colour of liquor	98.09%	79.79%	96.84%	86.93%

NST with NICU stay	100%	56.48%	99.02%	54.30%
NST with Perinatal outcome	96.45%	98.45%	93.33%	97.33%

The present study shows high sensitivity and positive predictive value of NST when compared with different parameters. From the above table it can be deduced that the NST can be used as a screening test in low resource settting.

V. **Discussion**

Majority of patients in the present study belonged to age groups 21-30years. In the low risk group the maximum number was 87 between 21-25years, comprising 43.5% of low risk group. Whereas 100 patients comprising 50% of the high risk group were between the age group 26-30years, indicating an increasing trends towards late age of marriage and child bearing. The mean age of reassuring NST was 26.23±3.63 years in low risk group and 27.92±3.91 years in high risk group, which was found to be statistically significant.

Shrestha P[13] et al in their study in 2015 observed the mean age in low risk pregnancy to be 25 years.

Himbandhu[14] et al in 2015 in their study of NST in high risk pregnancy assessed 50% and 23% patients between 21-25 years and 26-30 years respectively. In the present study the age distribution in high risk pregnancy was 24.5% and 50% between 21-25 years and 26-30 years respectively.Akhavan[15] et al in his study conducted from 2009-2014, concluded that the mean age for abnormal NSTs was 29 (±4.5) years.

In the present study primigravida constituted 70% of the low risk population, followed by 19% of patients who were second gravidae. Only 2% of the low risk group were fourth gravida. In the high risk group, 51% patients were primigravida, followed by second gravida who formed 29.5% of the high risk group. Gravida ≥4 constituted 8.5% of the patients in high risk group. 60.5% of the patients were primigravida followed by second gravid who formed 24.25% of the total patients included in the study. In a study conducted by Garg S et al 58.4% and 24.8% were primigravida and second gravida which can be compared to the present study.

In the present study Admission NST was done in all 200 patients in both the groups. In both the groups the admission NST was found to reassuring/normal in 96.5% of the patients. In high risk group, the number of Abnormal NST was noted to be 4.5% compared to 1.5% abnormal NST in the low risk group. The present study with 94.75% of reassuring study is comparable to the study conducted by Lenstrup C[16] et al and Garg S[17] et al with 95% and 90% of reassuring NST respectively. In low risk group the present study had 94% normal NST's that can be compared to the study conducted by Kulkarni AA[18] et al and Garg S[17] et al with 86% and 92% of normal NST's. In high risk group normal NST's were observed to be 93% which can be compared to 95% of normal NST's seen in the study conducted by Lenstrup C[16] et al.

In the present study, early amniotomy was done in both low risk and high risk depending on the fetal heart rate patterns observed during admission NST or repeat NST with cervical dilatation of ≤3cms. In the low risk group early amniotomy was done in 33% of patients and it was not done in 67% of the patients. In the high risk group, early amniotomy was done in 30.5% of the patients and it was not done in 69.5% of the patients.

The difference in performing amniotomy may be because the patients in high risk group many patients admitted themselves with complaints of prelabour rupture of membranes. Also, many patients in the high risk group were planned for elective LSCS. On the contrary in low risk group, the patients were admitted with no antecedent obstetrical history.

In the low risk group, early amniotomy was done in 30.05% of patients with reassuring/normal NST. In patients with non-reassuring or abnormal fetal heart rate pattern early amniotomy was done in all patients i.e. 100%. In high risk group early amniotomy was done in 29.03% of patients with reassuring NST and in 20% and 44.44% of patients with non-reassuring and abnormal NST respectively.

Segal D[19] et al in 1999, in their study observed that 42.4% with no previous caesarean section were delivered by LSCS. In the present study 56.92% patients in low risk and 44.78% patients in high risk with reassuring fetal heart rate pattern on admission NST were delivered by LSCS.

Ajadi MA[20] et al in 2006 and Smyth R[21] at al in 2013 didn't find any significant increase in the caesarean rates in patients with early amniotomy.

In the present study there was no statistical significance of early amniotomy in both the low risk group, and the high risk group. Whereas it was found to be statistically significant with NST in both the groups.

In the present study 96% patients in low risk group were given a trial of labour. The onset of labour was spontaneous in 51.5% of these patients in low risk group and 44.5% were induced for different reasons. In the high risk group, 47.5% of the patients were given a trial of labour. Only 7%of the patients in high risk group had a spontaneous onset of labour, and 87.16% of the patients were induced for either maternal or fetal high risk. In the present study 50% had an abnormal NST with meconium stained liquor which is comparable to the study conducted by Patel S[22] et al wherein it was observed to be 44.4%.

In the present study, in low risk group 64.5% patients delivered vaginally, In high risk group, 33% patients delivered vaginally(NVD), LSCS was done in 65.5% of the patients for various reasons which is similar

to a study conducted by Garg S[118] et al in 2016, 66.66% patients delivered vaginally in low risk group however 94.11% patients were delivered by LSCS in high risk group.

In the present study 94.2% of babies were vigorous with reassuring NST which is comparable to 95.75 vigorous babies observed in a study conducted by Himabindu P[14] et al. In the same study 4.3%babies were non-vigorous with reassuring NST which can be compared to 5.73% of non-vigorous babies in the present study.

With an abnormal NST 69.23% babies were vigorous and 30.77% were non-vigorous which can be compared to the study conducted by Patel S[22] et al with 61.1% and 38.9% of vigorous and non-vigorous babies respectively.

In the present study, total of 49.75% of the babies from both the group were admitted and/or readmitted to NICU, throughout their stay. 42% babies from the low risk group were transferred to NICU. 26.76% babies were kept in NICU for ≤24 hours. 20.24% of the babies were admitted in NICU, for >3days. Garg S[17] et al in their study conducted in 2016, observed 19.05% od NICU admissions in low risk group.

In the high risk group, the NICU admission was 57.5%, out of which, 26.96% were kept for <24 hours. 35.65% babies were kept in NICU for > 3days. Garg S[17] et al in their same study observed 27.5% of NICU admission in high risk group. The difference with study may be because, many patients are referred from other hospitals for better NICU facility at our hospital.

In the present day with reassuring NST the NICU admission in low risk group was 43.52% in the low risk group, whereas with abnormal NST, the admission rate to NICU was 100%. In the high risk group, the NICU admission with reassuring NST was 61.83%, with non-reassuring and abnormal NST, the admission was 100%.

Himabindu P[14] et al in 2015, observed 43.33% of NICU admissions. Patel S[22] et al in 2015, noted 44.4% of NICU admissions. The difference with the present study can be explained on the basis of hospital protocol.

In the present study, the correlation between the NST patterns were observed to be significant with NICU stay, but the correlation of NICU stay in low risk and high risk pregnancy was observed to be insignificant.

In the low risk group, NST in the present study was observed to have a sensitivity of 96.79%, 98.09%, 100%, and 96.45% when compared with parameters like Vigorous/Non-vigorous baby, colour of liquor, NICU stay and perinatal outcome. In the high risk group when comoared for the sane parameters viz, Vigorous/Non-vigorous baby, colour of liquor, NICU stay and perinatal outcome, the sensitivity was observed to be 92.97%, 96.84%, 99.02% and 93.33% respectively. The sensitivity of NST with NICU stay in high risk group is comparable to the sensitivity of 92.31% as observed by Himabindu P[14] et al. Similarly, the positive predictive value of NST with NICU stay was observed to be 54.30% comparable to the positive predictive value of 60% as observed by Munshi D[23] et al.

VI. Conclusion

To conclude, all pregnant patients must be encouraged to attend ANC clinic routinely, for early identification and timely management of any abnormal finding. Interpretation of NST should be according to guidelines, with least intra-observer and interobserver variations. In case of a non-reassuring or abnormal NST, immediate causes should be ruled out and patients should be given oxygen, iv fluids. The tracing should be informed to a senior obstetrician and to the patient and her relatives. Any abnormal fetal heart rate patterns in low risk or high risk should be investigated further with biophysical profile if delivery isn't a possibility in near future. If in labour, fetal hypoxia and acidosis should be ruled out with fetal scalp blood pH monitoring, or cord blood pH monitoring, and delivery should be expedited.

In low resource setting, where sophisticated procedures to evaluate fetal hypoxia or acidosis are unavailable, early amniotomy should be performed, if NST after correction remains non-reassuring or abnormal to exclude any fetal high risk and to expedite delivery.

At the end all interventions big or small should ensure a healthy mother, a healthy baby and a happy family.

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