"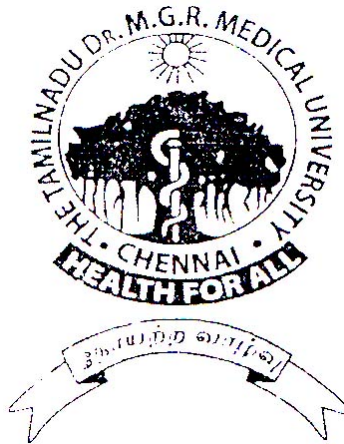A STUDY TO ASSESS THE EFFECT OF MATERNAL POSITIONS ON PHYSICAL AND PHYSIOLOGICAL PARAMETERS OF ANTENATAL MOTHERS AND FETUS DURING NON STRESS TEST IN A SELECTED HOSPITAL AT KOLLAM (DIST), KERALA"

M.Sc (NURSING) DEGREE EXAMINATION
BRANCH III – OBSTETRICS AND GYNAECOLOGICAL NURSING

R.V.S. COLLEGE OF NURSING
SULUR, COIMBATORE

THE TAMILNADU DR.M.G.R.MEDICAL UNIVERSITY
CHENNAI-32

MASTER OF SCIENCE IN NURSING
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"A Study to assess the effect of maternal positions on physical and physiological parameters of antenatal mothers and fetus during non stress test in a selected hospital at Kollam (dist), Kerala."

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CERTIFICATE

This is to certify that the dissertation **"A STUDY TO ASSESS THE EFFECT OF MATERNAL POSITIONS ON PHYSICAL AND PHYSIOLOGICAL PARAMETERS OF ANTENATAL MOTHERS AND FETUS DURING NON STRESS TEST IN A SELECTED HOSPITAL AT KOLLAM (DIST), KERALA"** is the bonafide work done by Maneesha.M.S , R.V.S college of Nursing, R.V.S Educational Trust, Sulur, Coimbatore, submitted to The Tamil Nadu Dr.M.G.R Medical University, Chennai-32, in partial fulfillment of the requirement for the award of the degree of M.Sc (Nursing) Branch III –Obstetric and Gynaecological Nursing under our guidance and supervision during the academic period from 2010-2012.

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ABSTRACT

"A Study to assess the effect of maternal positions on physical and physiological parameters of antenatal mothers and fetus during non stress test in a selected hospital at Kollam (dist), Kerala."

The aim of the study is to assess whether there is a significant difference in the physical and physiological Parameters of the antenatal mothers and fetus while carrying out the Non stress test during antenatal period in three different positions.

The conceptual framework used in the study was Ernestine Widenbach "The helping art of clinical nursing theory". A quasi experimental cross over design with one group design was used for this study. The data were collected from 30 antenatal mothers, who fulfilled the inclusion criteria and were admitted in the antenatal ward and labour room, in a selected hospital at Kollam.

The data was collected by interview method and observation checklist. The interview schedule consisted of a visual analogue discomfort scale with a recording form, one observational checklist and one questionnaire. Demographic data were categorized into (age, gestational age, abdominal girth, body mass index).

Discomfort was assessed in 4 levels- no discomfort, mild, moderate and severe discomfort in three positions (supine, left lateral, semi sitting). In all the three positions mothers experienced all the 4 levels of discomfort. In the three positions the mean score of discomfort were high in supine position 2.8. So the mother experiences more discomfort in supine position when compared to the other two position (left lateral and semi sitting). The F values for overall discomfort of mothers were 19.314 and the table value was 19.16, so the calculated value is greater than the table value, the researcher accepts the alternate hypothesis. There is a significance difference in the level of discomfort of mothers in three different positions during non stress test.

Statistically it shows that there is no significant difference in the physiological parameters of the mothers in the three positions before and during the non stress test. All the calculated 'F' values for the physiological parameters (pulse, respiration, systolic & diastolic pressure) before and during the test were less than table value, so the researcher accepted the null hypothesis.

All the calculated 'F' values for the physiological parameters of fetus (fetal heart rate, movements, acceleration) during the test were less than table value, so the researcher accepted the null hypothesis. There is no significant difference in the mean fetal heart rate, movement, and acceleration of the fetus during Non Stress Test in the three different positions.

There was a significant association of selected demographic variables with level of discomfort in supine position; the body mass index has χ^2 value of 3.35 at 0.05 levels at 3 degree of freedom which is greater than the table value 2.37. The mothers above 25 body mass index had severe discomfort. So supine position seems to be discomfort during non stress test compared to the other two positions (left lateral and semi sitting). In left lateral and semi sitting positions there is no association with demographic variables.

Here the researcher concludes that by providing different positions like left lateral, semi sitting during non stress test will enhance comfort to the mothers without changing the physiological parameters of both mother and fetus.

ACKNOWLEDGEMENT

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INTRODUCTION

My precious little baby
I have loved you from the start.
You are a tiny miracle
laying closely to my heart.
Each day I feel your presence,
each day you quickly grow.
Each day your heart beats softly,
as only I could know.
So I'll keep this in a special place,
and remember each year through,
of this very special time of life,
the months I carried you.

BACKGROUND OF THE STUDY

Evaluation of ante partum fetal condition has become essential to obstetric care in both normal and complicated pregnancies. Fetal distress is the condition in which fetal physiology is altered due to hypoxia so as to lead to death or permanent neurological injury. It is a progressive condition, and if not corrected will result in damage to central nervous system or death. There are so many biochemical and biophysical assessment methods that have been introduced during the past two decades. Few of the tests are based on fetal heart rate monitoring which plays an important role in management of women who are pregnant. Advances in perinatal care have resulted dramatic decrease of perinatal mortality. These advances include introduction of electronic fetal monitoring, ultrasound, computerized fetal assessment and so on. Continuous electronic fetal monitoring is currently the principal screening method for the diagnosis of fetal distress.

Listening the baby's heart beat is a special time for the pregnant women. Many women enjoy this time of antenatal visit appointments. There are a variety of ways that the mothers can listen their baby in pregnancy. The mother can hear the baby's heart beat at about 18-20 weeks depending on maternal and fetal factors.

The truth is that a normal fetal heart rate changes during the stages of pregnancy. At about 5 weeks of gestation, the baby's heart begins to beat. At this time, a normal fetal heart rate is about the same heart rate as the mother.

- Week 5 starts at 80 beats/minute and ends in 103 beats/minute
- Week 6 starts at 103 beats/minute and ends in 126 beats/minute
- Week 7 starts at 126 beats/minute and ends in 149 beats/minute
- Week 8 starts at 149 beats/minute and ends in 172 beats/minute
- From 9 weeks onwards the fetal heart rate within a range of 155-195 beats/minute
- At the middle of pregnancy the fetal heart rate ranges from 120-180 beats/minute.

The ability to ausculate fetal heart sounds by putting an ear to the mother's abdomen was recognized in the early 19th century. With the intervention of the stethoscope in 1810 and Pinard's version of fetal stethoscope in 1867, a criterion for normal fetal heart rate was formulated in the later part of the century.

The first electronic fetal monitor based on the Doppler technology was commercially available in 1968. The fetoscope is the modern combination of both the stethoscope and the pinard horn. The sound of the baby's heart beat like a watch under a pillow. The fetal Doppler uses ultrasound technology to bounce sound waves off the baby and return a representation of the fetal heart beat. The sound is that of galloping horse.

The aim of introducing Electronic Fetal monitoring into clinical practice was to reduce hypoxia related fetal morbidity and mortality, though originally proposed for high risk pregnancies. Electronic Fetal Monitoring is being used more and more in low risk pregnancies to detect any evidence of hypoxia and for the purpose of medico-legal documentation. Normal

range of fetal heart rate shows between 120 & 160 beats/minute. A rise above baseline with fetal movements is a reassuring sign.

Fetal monitoring may help with possible recognition of problems in the fetus, that will help the midwife or the physician to take appropriate action (other testing or delivery if necessary).

To aid identification, there should be clear local guidelines for identifying the low and high risk pregnancies, the former being suitable for community based care, the latter require antenatal assessment and recent years have seen a proliferation in the number of materno-fetal assessment units that allow out patient monitoring with a reduction in hospital admissions and better patient acceptance.

NON STRESS TEST

With the ever increasing use of technology in modern medicine for diagnosis and treatment of disease and disability and increasing expectations of the patients, the extension of technological advances into the field of obstetrics was inevitable

Electronic Fetal Monitor or the cardiotocograph is essentially a device for recording the fetal heart rate on a beat to beat basis and the uterine contractions. In the 1960s Professor **Hammacher and Hawlett-Packard** developed the first commercially available non invasive fetal monitor. The initial models were quite appropriately called "baby sitters". The cardiotocograph is equipment which can record a number of fetal and maternal parameters with facilities for up gradation and can be used through pregnancy and labour.

Freeman and Lee (1975) introduced the Non Stress Test to describe the fetal heart rate, acceleration in response to fetal movement as a sign of fetal health. This test is involved the use of Doppler detected fetal heart rate acceleration coincident with fetal movements perceived by the mother.

Electronic fetal monitoring was developed with the aim of helping the clinician or the midwife to identify fetal heart patterns predictive of impending fetal hypoxia, so that timely intervention could prevent permanent injury to the newborn. The consensus among obstetricians is that electronic fetal Monitoring is the method of choice in high risk pregnancies, but routine electronic fetal monitoring in low risk pregnancies remain controversial **(Neilson 1995, MacDonald et al 1985)**

A healthy fetal heart rate shows reactivity which variously defined, but two accelerations (heart rate increase of 15 beats per minutes above the baseline for 15 seconds) in 20 minutes is widely accepted. **Devoe et al (1985),** has shown that extension of the non stress test to 120 minutes reduces the incidence of non reactive cardiotocograph by 50% with no decrease in predictive value compared to pregnancies where there was a promptly occurring reactive pattern

Schncider, et al (1988), states that the predictive value of reactive Non stress test was good, with fetal death occurring within one week of reactive cardiotocograph at a rae of 4 per 1000.

Neilson (1994) looked at any randomized trial that aimed to assess the effects of antenatal fetal heart rate recordings on pregnancy outcome and management. Four trials were included with a total of 7000 patients who were considered to be high risk pregnancies for a variety reasons. The analysis provides no support for the use of cardiotocograph was a supplementary test of fetal wellbeing in the management of high risk pregnancies. He also comments that a cardiotocograph is an assessment of fetal wellbeing at that time and to expect such a test to produce a reduction in perinatal mortality in the manner of a screening test is unrealistic.

Paul et al (1995), the presence of decelerations in an antenatal Non stress test may present different problems. There is evidence that they are associated with an increased incidence in neonatal compromise but the specificity was poor and the significance of small variable decelerations remain unclear.

A study conducted by **Maria Roman Marcello Bracale (1996)** in Cardiotocography. (CTG) is the most widely used diagnostic technique in clinical practice to monitor fetal health. The aim of this study is to characterize fetal reactivity. Cardiotocographic recording also permits to assess maturation of the fetal autonomous nervous system (ANS): Fetal heart rate (FHR) modifications may reveal autonomous nervous system reactions to stimuli. To assess fetal reactivity, physicians evaluate specific clinical Cardiotocograph parameters, generally, by means of visual inspection, and with observer expertise. Still nowadays, there is a very high intra- and inter-observer variation in the assessment of FHR patterns. More objective methods for cardiotocograph interpretation are of crucial importance. Indeed, fetal heart rate variability is a good indicator of fetal well-being in non-stress conditions. Fetal reactivity is a very important cardiotocographic characteristic used to diagnose fetal distress, but its interpretation is still uncertain.

The change in pregnant women's heart rate and blood pressure due to chronic stress and anxiety will affect on the fetal heart rate. This study was published in **Developmental and Behavioural Paediatrics, 2003.**

A Cochrane collaboration review shown that use of cardiotocography reduces the rate of seizures in the newborn, but there is no clear benefit in the prevention of perinatal death and other complications of labour.

PHYSIOLOGICAL BASIS OF FETAL HEART PATTERNS

The fetal heart is innervated by nerve fibers from the autonomic nervous system. The efferents originate in both sympathetic as well as parasympathetic system. In a well oxygenated fetus, a constant modulation of these impulses takes place, which is reflected as fluctuations in the basal heart rate on the cardiotocograph, this is interpreted as the baseline variability.

The parasympathetic system matures later than the sympathetic system, usually becoming fully functional by 32-34 weeks of gestation. The fetal heart in the preterm fetus is therefore

higher, as it is predominantly under the influence of sympathetic activity. The baseline fetal heart rate gradually decreases as the vagal tone increases with advancing gestational age.

Peripheral baroreceptors and chemoreceptor influence the heart rate by maintaining a reflex control over the autonomic nervous system. Baroreceptors are stretch receptors which respond to changes in the blood pressure. A fall in systemic blood pressure will reduce the vagal activity leading to increase in fetal heart rate where as a rise in blood pressure reduces the sympathetic activity and increases vagal tone resulting in a reduction in fetal heart rate. Chemoreceptors are sensitive to changes in partial pressure of oxygen in fetal blood. Impulses from the peripheral receptors are modulated in the brain accounting for changes in fetal heart rate variability and deceleration.

Pillai & James (1990) studied the development of fetal heart rate acceleration patterns during normal pregnancy. Gestational age also is a factor influencing acceleration or reactivity of fetal heart rate. The percentage of body movements accompanied by accelerations increased with gestational age.

NEED FOR THE STUDY

It's a human nature that, our body itself takes some measures to reduce discomfort as soon as it is perceived. Among all the non-pharmacological techniques, positions are the one which does not require the presence of a nurse as it can be performed by the mother herself. Moreover, most of the studies are controlled by giving two positions during the non stress test.

The aim of modern obstetrics is to compare the quality of life of the mother and the fetus and to decrease both the maternal and perinatal morbidity and mortality.

For the past decades there are so many newer modalities that have been growing in popularity and usefulness in the ongoing effort to improve the safe obstetrical care. One of the modalities is the non stress test and it is particularly well suited for the application by nurse practitioners and midwife. It is relatively easy to perform and comparatively simple to interpret. The non stress test provides crucial information on the well being of the unborn baby. This

information can be used by the midwife or nurse practitioner to make rational decision regarding high risk pregnancy.

Wave and Devoe (2007) documented the Non Stress Test reassessment of the "Gold Standard". The Non Stress Test has been a desirable cornerstone in antenatal testing. The contemporary data suggest that fetal wellbeing is best surveyed by using the Non Stress Test. This test is a screening tool that has been found to be much better in identifying healthy fetus and sick ones. Therefore a normal reactive Non Stress Test identifies well being of the fetus in utero.

Non stress Test is a routine procedure in all hospital. It is done for all pregnant women both in normal and complicated cases. Commonly used position for the procedure is supine position. Here, the investigator introduced three positions like supine, left lateral and semi sitting positions.

When women in late pregnancy lie flat on their backs, the gravid uterus completely occludes the inferior venacava and laterally displaces the substernal aorta. This aortocaval compression reduces maternal cardiac output, and some of the pregnant women will exhibit 'supine hypotension syndrome'. Pregnant women who lie in a supine position may develop syncopal symptoms on Non Stress Test and get non reactive NSTs with a supine maternal position. The mother complaint of back pain also.

Many studies had been done in positions and the findings were conclusive. This made the investigator to consider without restricting a particular position to the mothers; the investigator introduced different positions to the mother during non stress test, to assess the level of discomfort in different positions.

In left lateral position the mother's comfort is more and there is a good acceleration shown in the graphical record. This position helps to increase blood flow and gets more rest also. Semi sitting position decreases the need for prolonged monitoring and enhances more comfort also.

STATEMENT OF THE PROBLEM

A study to assess the effect of maternal positions on physical and physiological parameters of antenatal mothers and fetus during Non Stress Test in a selected hospital at Kollam (Dist), Kerala

AIM OF THE STUDY

To assess whether there is a significant difference in the physical and physiological parameters of the antenatal mothers and fetus while carrying out the Non stress test during antenatal period in three different positions.

SPECIFIC OBJECTIVES;

The specific objectives of the study are

1. To assess and compare the self reported level of discomfort of antenatal mothers in three different positions (supine, left lateral, semi sitting) during Non Stress Test.

2. To assess the maternal physiological parameters (pulse, respiration, blood pressure) in three positions before and during the Non Stress Test.

3. To assess the fetal physiological parameters (fetal heart rate, fetal movements, acceleration) in three positions during the Non stress test

4. To determine the association between the level of discomfort of antenatal mothers and selected demographic variables.

HYPOTHESIS

H$_1$: Mean discomfort score of antenatal mother during Non Stress Test carried out in (supine, left lateral, semi sitting) positions will show significant difference.

H$_2$: Mean pulse, respiration, and blood pressure of antenatal mothers before and during Non Stress Test carried out in (supine, left lateral, semi sitting) positions will show significant difference.

H$_3$: Mean fetal heart rate, movement, and acceleration of the fetus during Non Stress Test carried out (supine, left lateral, semi sitting) positions will show significant difference.

OPERATIONAL DEFINITION

1. **Maternal positions:** It refers to the way in which mothers are placed in bed while carrying out the non stress test. The maternal positions used are supine- lying on back , left lateral- lying on side , semi sitting- sitting with back supported with a backrest in 45 degree angle

2. **Parameters:** It refers to what is being observed during the non stress test. In this study observation is done on the mother and fetus

   a) **Physical** parameters included in this study are self reported discomfort on Visual Analogue Discomfort scale.
   b) **Physiological parameters** are pulse-checked by pressing the radial artery for 1 minute respiration-by watching the chest movement for 1 minute. Blood pressure is monitored by sphygmomanometer.
   c) **Fetal** parameters include fetal heart rate, movement, and acceleration with the help of a machine called cardiotocograph

3. **Non Stress Test:** The fetal heart rates located with a stethoscope and place the cardiac transducer on the maternal abdomen which is held in position with a strap and the fetal wellbeing is assessed by fetal heart rate, fetal movements and acceleration through a displayed graph which is called cardiotocograph. Three times the procedure was carried out for a single mother with 20 minute duration

ASSUMPTION

Non stress test **is** carried out in different positions, the position suitable to each women is influenced by individual factors. Non stress test is a common procedure carried out in all pregnant women to assess the fetal well being in utero. Comfort and suitability will accord mother's perception.

DELIMITATION

- The study was delimited to
- Mothers with gestational age of 36-42 weeks
- Mothers who were admitted to one selected hospital for delivery
- Mothers posted for Elective caesarian

LIMITATION

The data on discomfort obtained through self reporting and observational schedule which may not be accurate.

SCOPE OF THE STUDY

Non stress test is a diagnostic procedure for assessing in utero fetal well being. In routine practice the mother is asked to lie down in supine position and is unable to express the discomfort felt during the procedure. Literature review depicts that the discomfort level in the

pregnant women especially in the last trimester was found to be high. Usually the non stress test procedure is of 20 minutes duration; hence the mother will feel much discomfort during the procedure. If the mothers positions was changed to some other positions like left lateral and semi sitting will enhance comfort to the mother and no variations in the materno-fetal parameters. Hence I choose this statement to make the non stress test more effective and comfortable to the mother.

CONCEPTUAL FRAMEWORK

The theoretical framework adopted for this study was **Ernestine Widenbach** "The helping art of clinical nursing theory".

Ernestine Widenbach is a nursing theorist. In her book, Clinical Nursing "A Helping Art" she identified elements of a prescriptive theory to meet the realities in clinical teaching.According to her view, the patient is an individual under treatment or care who experiences needs. The needs are requirements for maintenance or stability in a situation that may be perceived by the individual as a requirement for help.

Needs for help are defined as "measures or action required and decide which potentially restored or extend ability to cope with situational demand".Nursing is concerned with a patient is need for help. It has four components.

1. Philosophy
2. Purpose
3. Practice
4. Art

Philosophy is a personal attitude towards life and reality that involves from each nurses beliefs and code of contact, and motivates nurse to act, guides and influence her decision.

Purpose is that which the nurse wants to accomplish. Practice includes four components Identification, Ministration, Validation and Co-ordination of help and resources for help. The art of clinical nursing requires individualized interpretation of behavior in meeting needs for help.

In this study, identification means assessment. Assessment is the process of collecting data regarding for subsystem. Data on demographic profile (age, gestational age, abdominal girth, height, weight, body mass index, gravid, parity) physical parameter (discomfort of the mothers) and maternal and fetal physiological parameters (pulse, respiration, blood pressure, fetal heart rate, fetal movements, acceleration) among antenatal mothers who are undergoing non stress test.

Here ministration means positioning the mothers in three different positions (supine, left lateral, semi sitting) during the procedure non stress test.

In validation, the investigator validated the effectiveness of maternal positions during non stress test. The outcome of the study is assessing the discomfort level of mother, variation in fetal heart rate, accelerations and reactive result during Non stress test in left lateral position and semi sitting position when compared to supine position.

Figure 1 highlights the conceptual framework based on modified **Ernestine Widenbach** "The helping art of clinical nursing theory" (1963)

IDENTIFICATION	MINISTRATION	VALIDATION

MATERNAL FACTORS
- Demographic Characteristics
- Physical parameter (Discomfort)
- Physiological Parameters (pulse, respiration blood pressure)

FETAL FACTORS
- Physiological parameters (FHR, Movements, Accelerations)

NONSTREE

Supine position
- Mother feels more discomfort
- Mild variations in physiological parameters of mother
- Late acceleration
- Back pain and dyspnea present

Left lateral position
- Mother feels no discomfort
- Mild variations in physiological parameters
- Acceleration good with two movements
- No back pain

Semi sitting position
- Mother feels mild discomfort
- Mild variations in physiological parameters
- Early acceleration present
- Back pain present

Figure 1 represents conceptual framework on Ernestine Widenbach Theory (1963)

CHAPTER-II

REVIEW OF LITERATURE

Review of literature is a systematic identification, location, scrutiny and summary of written materials that contain information on research problems. The review of literature in a research report is a summary of current knowledge about a particular problem of practice and includes what is known and not known about the problem (**Hulme and Groves)**

Review of literature for the present study has been organized under the following headings,

1. **Literature related to Non Stress Test**
2. **Literature related to fetal heart rate during Non Stress Test**
3. **Literature related to fetal movements during Non Stress Test**
4. **Literature related to Acceleration during Non Stress test**
5. **Literature related to different maternal positions during Non Stress Test**

1. Literature related to Non Stress Test

L R Evertson, R J Gauthier, et.al (1979), conducted a study on new antepartum fetal heart rate (AFHRT) protocol that was put into clinical use. In this study contraction stress test (CST) and a new concept of non stress test (NST) are included. The non stress test was based on fetal heart rate response associated with fetal movements and was categorized as reactive (normal) or nonreactive (abnormal). The nonreactive fetus was then evaluated with a contraction stress test if not contraindicated. During the 24 months, a total of 2,422 non stress test were done in 1,169 patients, in that 1,547 (64 per cent) reactive and 829 (35 per cent) nonreactive. There were five perinatal deaths within one week of reactive non stress test. A reactive non stress test was as predictive of good outcome .Also, some nonreactive fetuses became reactive with oxytocin and showed good outcome. These observations were utilized in the development of a

newer, shorter non stress test which allows for fetal stimulation in an attempt to further define fetal well-being.

K A Keegan JR, R H Paul (1980), conducted a study, during for a year from 1.7.1977 to 30.6.1978. 1,877 Non Stress Test were performed in 895 patients. Criterion for a reactive test was two accelerations associated with fetal movement in 20 minute periods. Fetuses with nonreactive patterns were stimulated by abdominal wall manipulation. A total of 1,644 tests demonstrated reactive patterns and 229 tests were non reactive; 146 non reactive were followed by contraction stress test. During 75 contraction stress test, the pattern became reactive and the test was terminated. Seventeen of 71 completed contraction stress test were abnormal (24%). There were 634 patients delivered within one week of non stress test- contraction stress test. Seventeen of 62 patients with non reactive tests underwent cesarean section for fetal distress.

R. Babazadeh et al (2005) conducted a study to compare the results of the non stress test (NST) performed at 9:00 PM and 9:00 AM on women with high-risk pregnancies. The non stress test was performed two hours after a meal, at 9:00 AM and 9:00 PM, and the sample included in this study was, 80 women with high-risk singleton pregnancies. Each session lasted 20 min. If the non stress test was non reactive, the entire biophysical profile was immediately performed. The women's blood pressure was measured before 10 min, and at the end of the non stress test. Women who smoked or had uterine contractions were excluded from the study. There was a higher incidence of reactive non stress test and an increased number of fetal heart accelerations after 9:00 PM (82.5%) than at 9:00 AM (68.8%) ($P < 0.027$ $P < 0.001$). Evening non stress test would save time and decrease maternal anxiety.

2. Literature related to fetal heart rate during Non Stress Test

J Sasaki, Y Nabeshima, et.al (1993), conducted a study to determine the fetal physiology during swimming in pregnancy. To assess the fetal status, the fetal heart rate (FHR) was measured during maternal swimming. The sample included in this study was a group of seventeen women in normal pregnancy (during their third trimester, 35-38th week) who participated in a maternal swimming class. During swimming Doppler ultra-sound transducer for

underwater use was attached to the mothers' abdomen. FHR was recorded before, during and after swimming. The group swam from 375 to 750 meters in 33 to 41 minutes. During swimming, motion artifacts interfered with the FHR signal and only in eleven mother's fetal heart rate was detected. The mean FHR significantly interfered during swimming in eight of eleven women compared to the FHR recorded before the exercise. The FHR pattern was reactive and baseline variability was preserved in all cases. No pathological deceleration was seen. It is concluded that maternal swimming under such class conditions is safe for the fetus.

Joseph M Miller MD, Alison Rodriguez MD, (2004), conducted a study to evaluate documentation of fetal heart rate accelerations by two methods. The standard non stress test was performed prior to the ultrasound evaluation. The non stress test results were unavailable to the ultrasonographer. Then the ultrasound transducer was used to stimulate fetal movement by indenting the uterus over the fetal small parts. A second fetal heart rate was determined within 15 seconds after stimulation. When the non stress test was reactive, there is $\geq$15 beats per minute. But all nonreactive non stress tests were associated with an ultrasound response of 14 beats per minute or less. A receiver-operating characteristic curve comparing the ultrasound fetal response to the startle with the non stress test identified the area under the curve to be 0.948, consistent with high specificity and sensitivity

3. Literature related to fetal movements during Non Stress Test

S. Wilailak , S. Suthutvoravut (2004), conducted a study to determine the delayed maternal reporting of decreased fetal movement (DFM) associated with adverse pregnancy outcomes. The aim of the study was to evaluate an intervention to implementation on uniform information on fetal activity to women during the antenatal period. Among primiparous women with decreased fetal movement, a reduction in delayed reporting of decreased fetal movement ($\geq$48 hrs). No difference was shown in rates of consultations for decreased fetal movement or maternal concerns. Stillbirth rates and maternal behavior among women who were of non-Western origin, smokers, overweight or >34 years old were unchanged. Uniform information on fetal activity provided to pregnant women was associated with a reduction in the number of

primiparous women who delayed reporting of DFM and a reduction of the stillbirth rates for primiparous women reporting DFM.

Cherng-sa-ad, Y. Herabutya   (2004), conducted a study to compare, the results of fetal movement count as performed by either the attending staff or by the patients using the non stress test (NST). A total of 283 non stress tests were performed in 200 patients who had singleton pregnancy of at least 32 weeks gestation with indications for assessment of fetal well-being. Fetal movement counts performed by the attending staff and by the patients were recorded on 241 and 170 occasions, respectively. The results showed that the best correlation between fetal movement count by the attending staff with non stress test as three or more fetal movements within 10 min and the best correlation between fetal movement count by patients with non stress test was found when ten fetal movements within two hours was used as a cutoff point. The result of this study suggests that the usefulness of fetal movement count performed either by attending staff or patients as a cheap and effective method of screening for good fetal well-being in places where non stress test is not readily available.

Annette G. Olsen, Jens A. Savare (2007), conducted a study to determine the reduction or cessation of fetal movements (FMs). It was frequently reported by pregnant women. However, the clinical significance of a history of reduced fetal movements remains unclear. Fetal movements were monitored by the pregnant women to identify the compromised fetus, thus allowing for appropriate action. The new biophysiological profile are Cardiotocography, umbilical/uterine artery Doppler velocimetry, and ultrasonography which have been used for antepartum fetal assessment in pregnancies with decreased Fetal movements. The effects of fetal assessment with vibroacoustic stimulation and biophysical profile are unknown and should be further evaluated. Present recommendations on the management of pregnancies with decreased FMs are based on limited and inconsistent scientific evidence. There is a need for further well-designed studies in order to provide evidence-based guidelines in the future.

Eli Saastad, Julie Victoria Holm Tveit (2010), Maternal perception of fetal movement which came to be recognized as a valuable tool for early detection of fetal compromise. Fetal movement is a reliable sign of fetal well-being (Bennett & Brown, 1999:232). A study was

conducted to determine the knowledge of pregnant mothers to monitor the fetal movement and its effect on perinatal outcome. With these findings, the investigator conducted a health education programme that is contextual and relevant to the needs of pregnant mothers. A quantitative research survey design was used to obtain information from pregnant mothers. Simple random probability sampling was used. Ninety-seven pregnant mothers agreed to participate in the study. The results indicated that pregnant women who were able to perceive fetal movement during pregnancy regarded it as important. However, limited information on the importance of fetal movement monitoring in relation to perinatal outcome was displayed. The investigator recommended that health education regarding fetal movement monitoring during pregnancy was very much important.

4. Literature related to Acceleration during Non Stress test

Lee CY, Di Loreto PC, et.al (1990), Fetal heart rate (FHR) accelerations have never been fully investigated. These accelerations are responses of the healthy fetus to various stimuli and stresses. Observations and proper evaluation of FHR acceleration patterns will give reassurance of fetal well-being. The fetal activity acceleration determination (FAD) is a method of antepartum evaluation of fetal well-being. The FAD can be used where the oxytocin challenge test is contraindicated.

Daniels, S. M. and N. Boehm. (1991), conducted a study to determine whether there is a significant difference exists between the results of an electronically monitored non stress test (NST) and those of auscultation for single fetal heart rate acceleration, the auscultated acceleration test (AAT). Of 130 NSTs, both the NST and he AAT were reactive in 105 cases and both were nonreactive in seven cases. Eighteen nonreactive AATs went on to have reactive NSTs (72.00% false-positive rate). There were no reactive AATs that went on to have nonreactive NSTs (0% false-negative rate). Various recommendations are made for future research in an attempt to decrease the false-positive rate. The McNemar's test for data analysis is used in previous research which indicated that there was a significant difference between the two tests. However, the sensitivity (100%) and specificity (85.37%) of the AAT indicate that the test

is valid in predicting the results of the NST and thus appears to be a valid screening tool for fetal well-being and may be a reliable alternative to the NST.

J. Milliez, H. Legrand (2005), conducted a study to determine the relationships between fetal movements, fetal heart rate accelerations associated with such movements. No correlation has been found between absence of fetal movements and neonatal distress. A correlation has been found between the lack of fetal heart rate accelerations, the flatness of the record and poor neonatal outcome. In extreme situations (i.e. flatness in less than 10% of the record or in more than 80%) the presence or absence of accelerations does not add further useful information. Such information, however, is gained in the intermediary situations (the 'combined' recordings) and particularly when the record is between 51 and 80% flat where there appears to be an 85.6% risk to the fetus. When trying to analyze an antenatal record it seems advisable to take primarily into account the percentage of flat recordings (providing the records are numerous enough and of sufficient length). Then, in records between 10 and 50% flat, the presence or the lack of spontaneous decelerations requires consideration whereas, when the record is between 51 and 80% flat, it is the presence or absence of fetal heart rate accelerations which is important.

5. Literature related to different maternal positions during Non Stress Test

M. Friedman, M.Y. Divon (2004), conducted a study to determine the effect of the maternal postural position during Non stress Test (NST).The sample included in this study was 14 normal pregnancies at 38–40 weeks of gestation. Each woman was studied for two periods of 30 min, each in the standing and left lateral recumbent positions. Comparing both positions no significant difference was found in the number of fetal movements and heart rate accelerations. The total surface area of accelerations (TSAA) was significantly larger in the standing position.

Cito G , Luisi S, Mezzesimi A, (2007) conducted a study on, a total of 1055 non stress test lasting 30 min were performed in 368 antenatal mothers with low-risk pregnancies. On the basis of maternal position during the test, the group was divided into three groups: reclining, sitting, and walking. In this study the parameters considered were the number of minutes of reactive non stress test with minimum length, number of fetal movements, fetal heart rate

baseline, number of large accelerations, number of dubious non stress test, and number of variable decelerations. Fetal heart rate patterns in low-risk pregnancies were studied using non stress test in different gestational ages and in different maternal positions. Differences in heart rate were found in relationship to both gestational age and maternal position. The minimum length of non stress test necessary to record at least three large accelerations was significantly different in relationship to both gestational age and maternal position. The number of fetal movements perceived by the mother was greater in the reclining position than in sitting or walking. Together with the progression of pregnancy, the number of dubious non stress test decreased in all subgroups, especially in the sitting position. The greatest number of variable decelerations was observed in the reclining position and it was increased with pregnancy progression. The non stress test duration did not vary greatly in the reclining position, but in the sitting position or during walking, the time taken to record the three large accelerations required to define the trace as reactive, decreased significantly with the progression of pregnancy. Non-stress test in sitting position or during walking should be encouraged because fetal reactivity is more quickly observed.

Aluş M, Okumuş H, Mete S, et.al (2007), conducted a study to determine the effects of different maternal positions on non-stress test results and the preferences of mothers for involving positions. Experiment design with randomly assigned four positions: supine, left lateral, semi-fowler and sitting up. The sample included 408 women in a university hospital in Turkey. Women were randomly assigned to four groups in equal numbers of 102.. Main outcome measures were percentage of reactive non stress test and number of minutes for reactivity in each position. There were significant (P < 0.05) differences among four groups. Supine position showed the least fetal reactivity. In terms of time to reactivity, there were no statistically significant differences. Qualitative data showed that pregnant women were least comfortable in supine position reporting back pain and shortening of breath

Abitbol MM, Monheit AG, **et.al (2008)**, conducted a study to determine antepartum evaluation of 225 low-risk primipara and 262 high-risk primipara and multipara using non stress test .In that 53 patients were nonreactive when the test was performed in the supine position. When the test was repeated in the lateral decubitus position, it became reactive non stress testing

in 21 of these patients. This group of patients with a supine nonreactive non stress test and a lateral reactive non stress test demonstrated an associated compression of the abdominal aorta by the pregnant uterus in the supine, but not the lateral position. This study distinguishes three types of nonreactive non stress tests: those due to placental insufficiency, those resulting from compression of the abdominal aorta by the pregnant uterus, and the falsely nonreactive. The percentage of false nonreactive non stress tests results will be reduced by performing the test in the lateral decubitus position.

Ely B. Nathan, Shoshana Haberman (2010), conducted a study to determine whether maternal posture (left lateral recumbent vs semi-Fowler position) had any effect on non stress test results when the test was performed for a shortened period (10 minutes). In this randomized clinical trial of 108 patients with singleton pregnancies at 32 to 42 weeks' gestation, patients were randomly assigned to a "sitting first" (semi-Fowler position) or a "supine first" (left lateral recumbent position) group at the initial visit. The order of position was alternated at subsequent visits. Ten minutes of fetal heart rate monitoring was performed in each position at each visit. Computer analysis of the non stress test was used to interpret each 10-minute segment for reactivity. Statistical analyses were performed on the paired non stress test unit (sitting and supine). There were no adverse clinical outcomes among the participants. Logistic regression analysis showed that both the sequence of the non stress test and the position were significant and independent factors related to non stress test reactivity. Tests performed during the second 10 minutes and tests performed with the patient in the semi-Fowler position were more likely to have reactive results. The semi-Fowler position is a superior position for conducting a non stress test in a short period. Use of this position could decrease the need for prolonged monitoring, thus leading to a more time-effective evaluation of patients at risk.

CONCLUSION:

The review of literature enlightened the investigator to develop an insight into the non stress test, fetal heart rate, fetal movements, acceleration and different positions used in non stress test .This review helped the investigator to gain a deeper knowledge of the research problem and guided in designing the study.

CHAPTER-III

RESEARCH METHODOLOGY

This chapter explains the methodology adopted by the researcher to assess the physical and physiological parameters of the mother and fetus during the non stress test. It deals with the research design, variables of the study, setting of the study, population, and selection of the sample, development of the tool, pilot study, data collection procedure and the statistical analysis.

RESEARCH APPROACH

A descriptive survey approach was used.

Descriptive research describes the existing phenomena as it is. Descriptive research studies can serve to discover new meaning and to provide new knowledge when there is a very little known about a topic of interest.

RESEARCH DESIGN

Quasi experimental cross over design with one group

$$O_1----X_1O_2----O_3----X_2O_4----O_5-----X_3O_6$$

X_1 – Supine position

X_2 – Left lateral position

X_3 – Semi sitting position

O_1, O_3, O_5– Observations before non stress test (checking pulse, respiration, blood pressure before the non stress test)

O_2, O_4, O_6– Observations during non stress test (checking pulse, respiration, blood pressure during the non stress test during non stress test)

Here the researcher administered three interventions (positions) for the same group of mothers at three different time morning, afternoon and evening in one day.

VARIABLES OF THE STUDY

Independent variables in this study were selected positions (supine, left lateral, semi sitting)

Dependent variables were certain maternal and fetal physiological parameters like maternal discomfort, pulse, respiration, blood pressure, fetal heart rate, movements and accelerations.

SETTING OF THE STUDY

The study was conducted in the labour ward of a selected hospital at Kollam, Kerala. The total bed strength of the hospital is 250. The hospital has all facilities for obstetrical and gynecological services.

The labour ward has 8 beds and 3 labour tables and an average of 6 deliveries take place. Nearly 250 normal deliveries are conducted per month. The hospital conducts antenatal clinic and an average of 80 -100 antenatal mothers attend the clinic per day. In the antenatal OP, where the mothers come with complaints of decreased fetal movements, they are sent to the labour ward for non stress test procedure.

Non stress test is a routine procedure carried out for all the mothers who are coming for delivery in that hospital. There are two machines for carry out the procedure, one for inpatient and one for outpatient.

POPULATION

The population consisted of all the pregnant mothers who were admitted for labour and elective caesarean at the selected hospital

SAMPLE SIZE

The sample consisted of 30 antenatal mothers who fulfilled the criteria for sample selection and were admitted at the selected hospital for delivery.

SAMPLING TECHNIQUE

A convenient sampling technique was adapted for the selection of sample according to the availability and convenience of the sample based on the eligibility criteria.

CRITERIA FOR SAMPLE SELECTION

The following were the criteria for selection of samples for the study

Inclusion criteria

- Both primi and multigravida mothers
- Mothers between 20-35 years of age

- Mothers admitted for delivery & caesarean section
- Mothers who could interact in Malayalam & English
- Mothers who were willing to participate

Exclusion criteria

- Mothers in labour
- In emergency situation

DESCRIPTION OF THE TOOL

The tool for the data collection was an interview schedule and a visual analogue discomfort scale.

Part: 1 Demographic data

Demographic data consisted of personal information like age, gestational age, Last menstrual period, Expected date of delivery, weight, height, abdominal girth, body mass index.

Part: 2 Observational schedules

The observational schedule was prepared for assessing maternal and fetal physiological parameters, which consisted of pulse, respiration, blood pressure of the mothers and fetal heart rate, fetal movements and acceleration of the fetus. This was organized under the three positions supine, left lateral and semi sitting. were provided to assess the parameters before and during non stress test.

Part: 3 Assessing discomfort of the mothers during non stress test

Visual Analogue Discomfort Scale. It is a standardized tool developed by Dr.Galer & Jensen (1997) to assess the discomfort of the mothers.

Scoring and Interpretation

Visual Analogue Discomfort Scale was classified into four

        0   - No Discomfort

        1 - 3   - Mild Discomfort

        4 - 6   - Moderate Discomfort

        7 - 10   - Severe Discomfort

DEVELOPMENT OF THE TOOL

The tool was developed based on the objectives of the study, review of literature and discussion with experts. The researchers own experience also contributed in developing the tool

CONTENT VALIDITY

Content validity refers to the degree to which an instrument measures what it is intended to measure **(Polit and Hungler-1999)**

In order to establish content validity, the tool was given to three nursing experts and two medical experts in the field of obstetrics and gynecology. All the nursing experts had the qualification of Master degree in Obstetrics and Gynecological Nursing. The two nursing experts were working as Principals in reputed nursing college. The third one was an Associate Professor in a Nursing College. The Medical expert (MBBS, DGO) was working as a consultant in one of the private hospital in Coimbatore. The final approval was sought from the guides and the tool was prepared then for the pilot study.

RELIABILITY

Reliability of the tool was established by interrater method. The reliability of the physiological parameters of the mother checked before carried out the procedure. The reliability was calculated by Karl Pearson's co-efficient correlation. The obtained 'r' values were, in supine

position the reliability of (pulse=0.93, respiration=0.97, systolic pressure=1, diastolic pressure=0.8, fetal heart rate=0.96). In left lateral position the reliability of (pulse=0.99, respiration=0.98, systolic pressure=1, diastolic pressure=0.87 fetal heart rate=0.85). In semisitting position (pulse=0.99, respiration=0.97, systolicpressure=0.85, diastolic pressure=0.82, fetal heart rate=0.96).The physical parameter, which was the discomfort level of the mother was assessed with visual analogue discomfort scale. It is a standardized tool tested and proven to be reliable 0.995. This confirmed the high reliability of the tool in terms of equivalence.

PILOT STUDY

A pilot study generally involves a small sample of subjects drawn from the same population as those from which study sample will be drawn. The pilot study was conducted in the private hospital in Kerala. A formal permission was sought from the Medical Director of the hospital to conduct the pilot study. The pilot study was done on six antenatal mothers who had come for the delivery to the hospital.

First the investigator gave self introduction and established rapport with the participants. The nature of the study was explained to the samples and the verbal consent obtained from the mothers.

The procedure was carried out in three different positions (supine, left lateral, semi sitting) at three different timings (8am, 1pm, 6pm). During the morning mothers were asked to lie down in supine position and check the pulse, respiration, blood pressure and started the procedure. After ten minutes the Visual Analogue Discomfort Scale was shown and the mothers was asked to point on the scale, then checked the pulse, respiration and blood pressure were checked of the mother. The procedure lasted for 20 minutes.

The duration of the pilot study was three days. The investigator identified difficult in administering one part of the tool, so it was changed, before doing the main data collection. During the pilot study timing of acceleration was assessed for fetal parameters then it was changed to number of acceleration during non stress test.

DATA COLLECTION METHOD

Before the commencement of data collection, permission for the main study was obtained from the advisor of the selected hospital. Then the investigator was advised to meet the Nursing

Superintendent. The researcher established adequate rapport with the labour ward staff and briefed about the research study in order to conduct the study well.

First the investigator developed rapport with the mother, met all the basic needs and provided comfortable bed. Antenatal records were checked. The sample which fulfilled the inclusion criteria were selected by convenient sampling technique. The investigator gave explanation regarding the study to each antenatal mothers and obtained verbal consent from them.

After selecting the mothers pulse and respiration were checked by manual method and blood pressure by sphygmomanometer. Discomfort was assessed with Visual Analogue Discomfort Scale and fetal heart rate, fetal movements, acceleration by strip obtained from the cardiotocograph. In the first observation non stress test was done in supine, second left lateral and third semi sitting position respectively. Before non stress test pulse, respiration, blood pressure was checked. The fetal heart rate was assessed using a pinard stethoscope and marked; a transducer was stripped on the marked area, for assessing the fetal heart rate throughout non stress test. A device was given to the mother to press when she felt the fetal movement. After 10 minutes of the procedure Visual Analogue Discomfort Scale was shown to the mother to assess the discomfort level of the mother followed by monitoring of pulse, respiration and blood pressure. Subsequently during afternoon and evening the same procedure carried out in the same manner in left lateral position and semi sitting position.

Average time spent for each mother was about 20 minutes. The researcher stayed in the labour ward for 8-10 hours. The researcher was able to get one or two samples per day. Total period of data collecting was six weeks. The mothers were very co-operative in giving responses on the discomfort scale.

PLAN FOR DATA ANALYSIS

The data were obtained and analyzed in terms of the objectives of the study using descriptive and inferential statistics. The plan for data analysis would be as follows.

DESCRIPTIVE STATISTICS

Frequency and percentage distribution were used to analyse the demographic variables, degree of discomfort in different position during non stress test.

INFERENTIAL STATISTICS

Analysis of variance was used to determine the significant difference between the level of discomfort and positions and physiological parameters of both mother and baby.

χ^2 test was used to assess the association of demographic variables with level of discomfort during non stress test.

ETHICAL CONSIDERATION

The researcher considered all necessary precautions to prevent ethical issues. Nature, purpose and type of the study and intervention were explained. The written consent from the higher authorities was obtained and the permission was granted by them. A brief introduction of the study was given to the participants. Willingness of the antenatal mothers to participate in the study was considered as important. But throughout my study period no complications were developed in any of the samples. Adequate explanation was given whenever they asked questions, and records were maintained for each sample confidentially.

CHAPTER-IV

ANALYSIS AND INTERPRETATION OF DATA

James. A. Fain (2003), defines data analysis as the systematic organization and synthesis of research data and testing of research hypothesis using those data. Interpretation is the process of making serve of the research of the study and examining their implication.

This chapter deals with the analysis and interpretation of data collected from 30 antenatal mothers in selected hospital at Kollam, Kerala.

The data have been analyzed and presented under the following headings,

Section-I Demographic characteristics of the sample

Demographic characteristics of the sample have been presented in relation to personal characteristics which include age, gestational age, abdominal girth, body mass index, gravida and parity.

Section-II Assessment of discomfort of the samples

This analysis has been done in frequency and percentage for comparing the three positions and assessing the level of discomfort of mothers. Also analysis has been done in mean score, standard deviation and level of significance in three positions.

Section-III Assessment of physiological parameters of the samples (maternal & fetal)

This analysis has been done for the mean, standard deviation and level of significance of physiological parameters of mother (pulse, respiration, blood pressure) and fetal (fetal heart rate, movements, acceleration)

Section–IV Association of demographic characteristics and level of discomfort of the samples.

This section presents the association of selected demographic variables with the discomfort level in three positions (supine, left lateral, semi sitting)

SECTION I - DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE
TABLE-I
DISTRIBUTION OF SAMPLES ACCORDING TO DEMOGRAPHIC VARIABLES IN FREQUENCY AND PERCENTAGE

N=30

S. No	Characteristics	F	%
1.	**Age in years**		
	a) Below 20	5	16.67
	b) 21-25	14	46.67
	c) 26-30	8	26.67
	d) Above 30	3	10.00
2.	**Gestational Age in weeks**		
	a) 36-37	5	16.67
	b) 38-39	22	73.33
	c) 40-41	3	10.00
3.	**Abdominal Girth in cm**		
	a) 90-99	4	13.33
	b) 100-109	14	46.69
	c) 110-119	11	36.67
	d) Above 120	1	3.33
4.	**Body Mass Index**		
	a) Below 20	1	3.33
	b) 20-24.9	12	40.00
	c) 25-29.9	12	40.00
	d) 30-39.9	5	16.67
5.	**Gravida**		
	a) Gravida 1	18	60.00
	b) Gravida 2	12	40.00
6.	**Parity**		
	a) Parity 0	19	63.3
	b) Parity 1	11	36.7

Table I represents the frequency and percentage distribution of samples based on demographic characteristics.

Age:

Age of the samples ranged from 18-35 years. Nearly half of the sample 14 (46.67%) were in the age group of 21-25, 8 (26.67%) of samples were in the age group 26-30 years and remaining 16.67% were below 20 years of age and 10% were above 30 years.

Gestational Age

Majority of the samples 22 (73.33%) were in the gestational age group of 38-39 weeks, remaining 3-5 (10-16.67%) were either in the gestational age 40-41 weeks and 36-37 weeks.

Abdominal girth

Abdominal girth varied from 90 to above 120. Nearly half of the sample 14 (46.69%) had an abdominal girth of 100-109cm, 11 (36.67%) had 110-119cm, 4 samples (13.33%) had 90-99cm and the rest 3.33% had above 120cm.

Body mass index

A healthy mothers body mass index was in between 20-24.9, for twelve (40%) of the samples the body mass index was either 20-24.9 or 25-29.9, 5 (16.67%) of the samples had a body mass index of 30-39.9 and rest 1 (3.33%) had below 20.

Gravida

Majority of the samples (60.00%) were primi mothers and the remaining 40% were the multipara mothers

Parity

Majority of the samples (63.30%) were of parity 0 and remaining (36.6%) were of parity 1

TABLE-II

FREQUENCY AND PERCENTAGE DISTRIBUTION OF SAMPLES ACCORDING TO LEVEL OF DISCOMFORT IN THREE POSITIONS DURING NON STRESS TEST

N=30

S.No	Level of Discomfort	Positions					
		Supine		Left lateral		Semi sitting	
		F	%	F	%	F	%
1.	No	6	20	19	63.33	15	50
2.	Mild	3	10	11	36.67	11	36.67
3.	Moderate	12	40	_	_	4	13.33
4.	Severe	9	30	_	_	_	_

Table-II represents the frequency and percentage distribution of samples according to level of discomfort in three positions during non stress test

The three positions used for non stress test was supine, left lateral and semi sitting. In supine position 6 (20%) samples had no discomfort, 3 (10%) had mild discomfort, 12 (40%) had moderate discomfort and 9 (30%) had severe discomfort. In left lateral position, majority of samples 19 (63.33%) had no discomfort, and11 samples (36.6%) had mild discomfort. In semi sitting, half of the samples 15 (50%) had no discomfort, 11 (36.67%) had mild discomfort and 4 (13.33%) had moderate discomfort.

The table concludes that among the three positions, left lateral position gave more comfort compared to the other two positions.

Figure-2 highlights the level of discomfort in three positions.
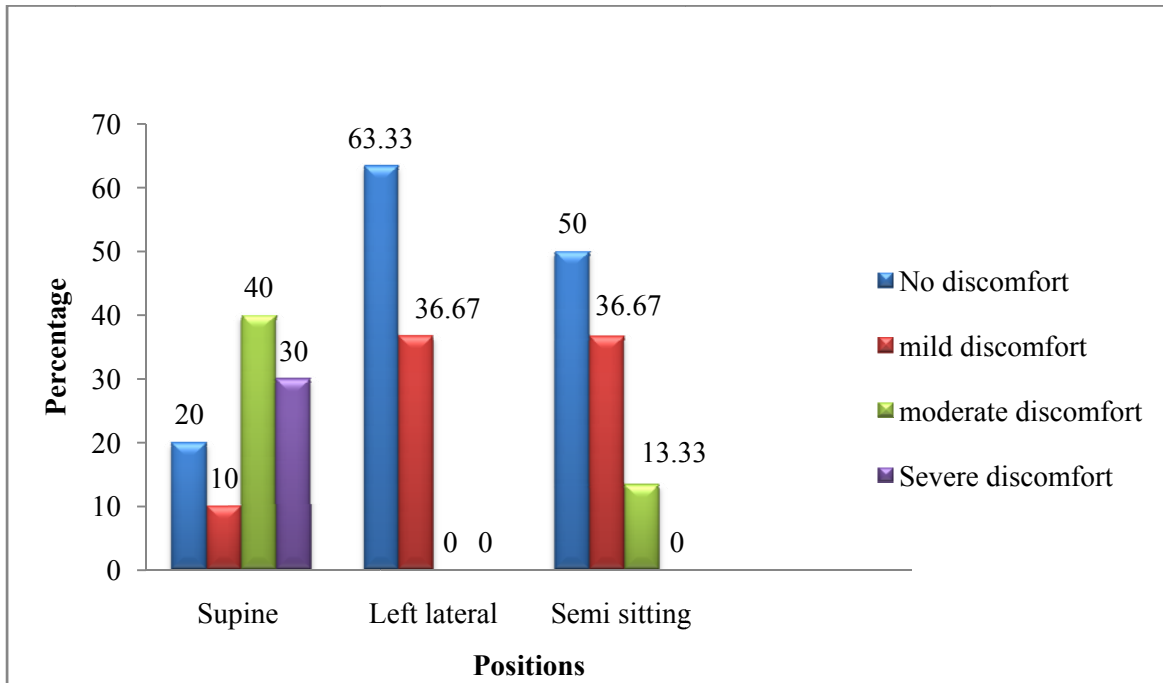
Figure 2: Discomfort level of antenatal mothers in three positions during non stress test in percentage

TABLE-III

MEAN DISCOMFORT AND STANDARD DEVIATION OF THE
SAMPLES IN DIFFERENT POSITIONS DURING
NON STRESS TEST AND LEVEL OF SIGNIFICANCE

N=90

S.No	Positions	Mean	SD	'F' value P≤0.05 df=(2,3)
1.	**Supine**	2.8	1.09	
2.	**Left lateral**	1.37	0.49	19.314[*]
3.	**Semi sitting**	1.63	0.72	

Table value = 19.16

Table IV represents the mean discomfort and standard deviation of the
Samples in different positions during non stress test

In the three positions the mean score of discomfort was high in supine position 2.8. In semi sitting 1.63 and 1.37 in left lateral position. So the samples experienced more discomfort in supine position and less discomfort in left lateral position

The table shown that there was a significant difference in the mean discomfort of samples in the three positions (F=19.314, P≤0.05, df = (2, 3)).

The hypothesis H1: There is a significant difference in the mean score of discomfort of samples in three different positions during non stress test is accepted.

TABLE- IV

FREQUENCY AND PERCENTAGE DISTRIBUTION OF SAMPLES BASED ON THE PHYSIOLOGICAL PARAMETERS OF SAMPLES IN DIFFERENT POSITIONS BEFORE NON STRESS TEST.

N= 90

S.No	Physiological parameters	Supine		Left lateral		Semi sitting	
		F	%	F	%	F	%
1.	**Pulse**						
	a) < 60	-	-	-	-	-	-
	b) 60-100	30	100	30	100	30	100
	c) > 100	-	-	-	-	-	-
2.	**Respiration**						
	a) < 15	1	3.30	1	3.33	-	-
	b) 16-25	17	56.67	26	86.67	23	76.67
	c) > 26	12	40.00	3	10.00	7	23.30
3.	**Systolic**						
	a) < 110	4	13.3	6	20.00	5	16.67
	b) Normal (110-120)	17	56.6	21	70.00	19	63.33
	c) > 120	9	30.0	3	10.00	6	20.00
4.	**Diastolic**						
	a) < 60	1	3.33	2	6.67	1	3.33
	b) Normal (60-80)	22	73.33	26	86.67	25	83.33
	c) > 80	7	23.33	2	6.67	4	13.3

Table–4 frequency and percentage distribution of samples based on the physiological parameters in different positions before non stress test.

In all the three positions (supine, left lateral, Semi sitting) the mother had normal pulse rate ranging from 60-100.

Majority of the mothers (17-26) had normal respiratory rate (16-25) in all the three positions. Comparatively more mothers 26 (86.67%) in left lateral position had normal respiratory rate. 23 mothers (76.6%) in semi sitting position, 17 mothers (56.67%) in supine position had normal respiratory rate

Majority of the mothers had normal systolic pressure (110-120). 21 mothers (70.00%) in left lateral position had normal systolic pressure and 19 mothers (63.40%) and semi sitting position and 17(56.6%) mothers in supine position had normal systolic pressure.

Majority of the samples in all the positions had normal diastolic pressure (60-80). 26 mothers (86.7%) had normal diastolic pressure in the left lateral position compare to the other positions semi sitting 25 (83.33%) and supine positions 22 (73.33%).

The table concludes that the majority of the mothers are having normal pulse, respiration and blood pressure before the non stress test

Figure 3 highlights percentage of samples in three positions according to respiratory rate before non stress test.

Figure 4 highlights percentage of samples in three positions according to systolic pressure before non stress test.

Figure 5 highlights percentage of samples in three positions according to diastolic pressure before non stress test.

Figure 3: Percentage of sample in three positions according to respiratory rate before non stress test

Figure 4: Percentage of sample in three positions according to systolic pressure before non stress test

Figure 5: Percentage of sample in three positions according to diastolic pressure before non stress test

TABLE-V

FREQUENCY AND PERCENTAGE DISTRIBUTION OF SAMPLES BASED ON THE PHYSIOLOGICAL PARAMETERS OF SAMPLES IN DIFFERENT POSITIONS DURING NON STRESS TEST.

N=90

S. No	Physiological parameters	Supine		Left lateral		Semi sitting	
		F	%	F	%	F	%
1.	Pulse						
	a) < 60	-	-	-	-	-	-
	b) 60-100	30	100	30	100	30	100
	c) > 100	-	-	-	-	-	-
2.	Respiration						
	a) < 15	1	3.33	1	3.33	1	3.33
	b) 16-25	17	56.67	23	76.67	23	76.67
	c) > 26	12	40.00	6	20.00	6	20.00
3.	Systolic						
	a) < 110	3	10.00	13	43.33	2	6.67
	b)Normal (110-120)	17	56.67	14	46.67	24	80.00
	c) > 120	10	33.33	3	10.00	4	13.33
4.	Diastolic						
	a) < 60	2	6.67	4	13.33	-	-
	b) Normal (60-80)	23	76.67	25	83.33	27	90.00
	c) > 80	5	16.67	1	3.33	3	10.00

Table 5 represents the frequency and percentage distribution of samples based on the physiological parameters of mothers in different positions during non stress test.

In all the three position (supine, left lateral. Semi sitting) the mother had normal pulse rate ranging from 60-100.

Left lateral position and semi sitting position 23 mothers (76.67%) had normal respiratory rate.Where as in supine position only 17 mothers (56.67%) had normal respiratory rate (16-25).

Majority of the mothers had normal systolic pressure (110-120). 24 mothers (80%) in semi sitting position had normal systolic pressure, Compared to the other two positions left lateral position had 14 (63.40%) and in supine position had 17(56.6%).

Most of the, 27 mothers (90%) had normal diastolic pressure in the semi sitting position. In other two positions mothers in left lateral had 25 (83.33%) and mothers in supine 23 (76.67%) had normal diastolic pressure.

Table concludes that majority of mothers in semi sitting position and left lateral position had normal respiration when compare with supine position. Systolic pressure was normal in semi sitting position compared with other two positions

Figure 6 highlights percentage of samples in three positions according to respiratory rate during non stress test.

Figure 7 highlights percentage of samples in three positions according to systolic pressure during non stress test.

Figure 8 highlights percentage of samples in three positions according to diastolic pressure during non stress test.
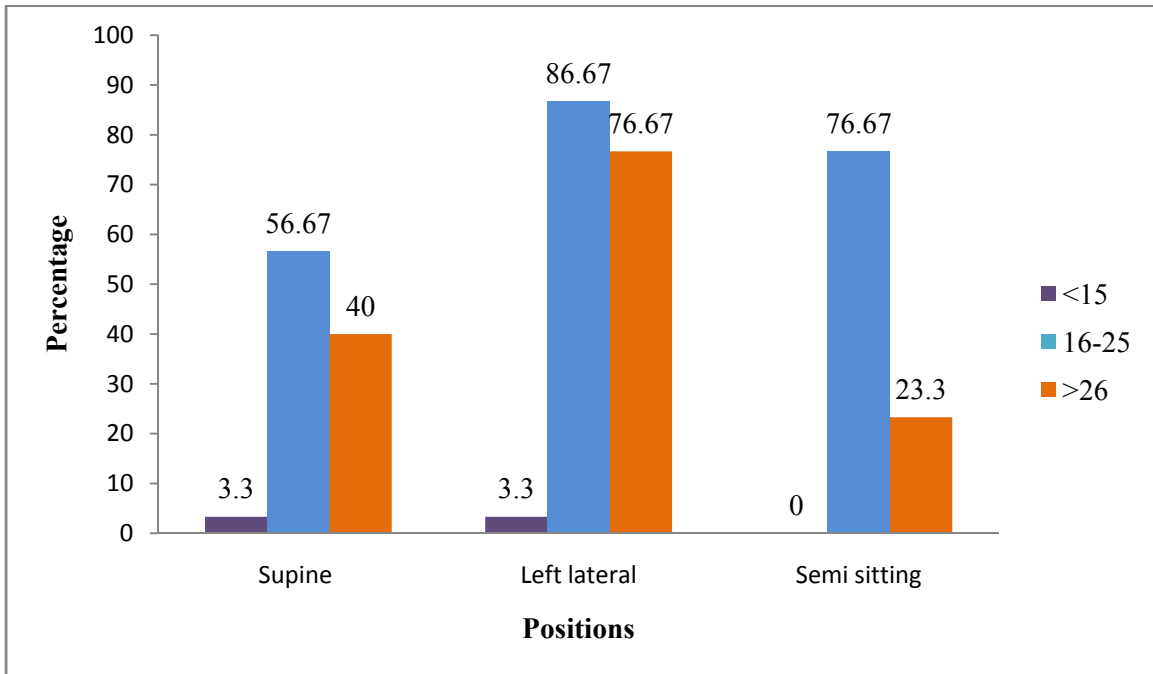
Figure 6: Percentage of sample in three positions according to respiratory rate during Non stress test
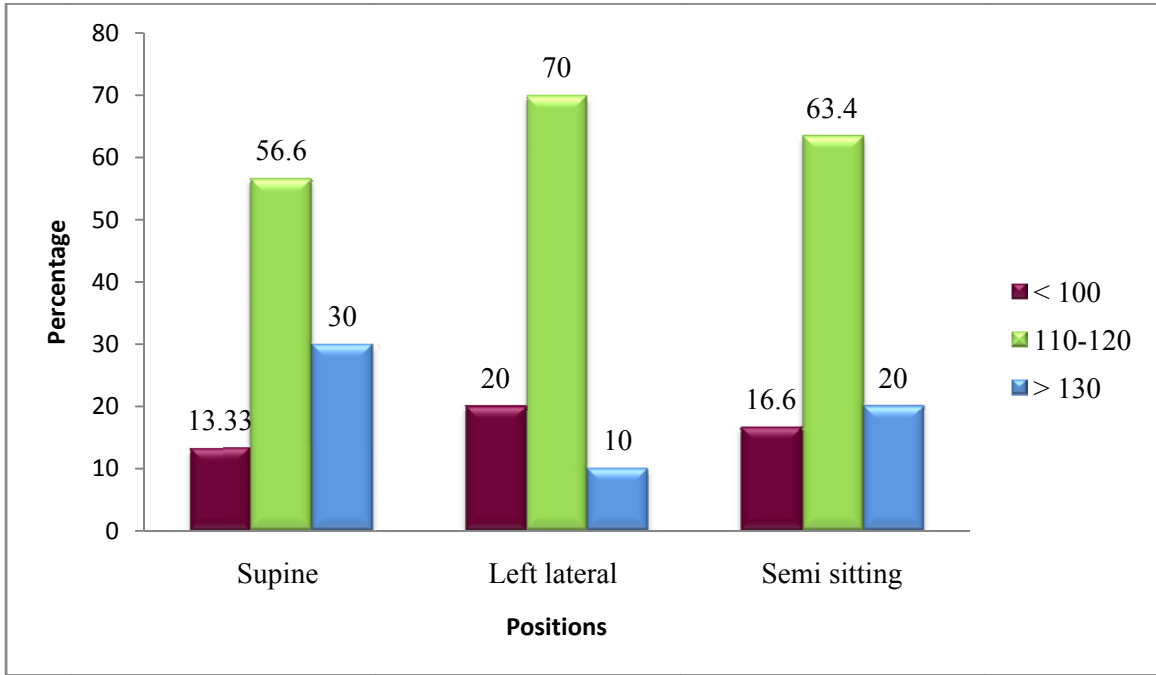
Figure 7: Percentage of sample in three positions according to systolic pressure during non stress test
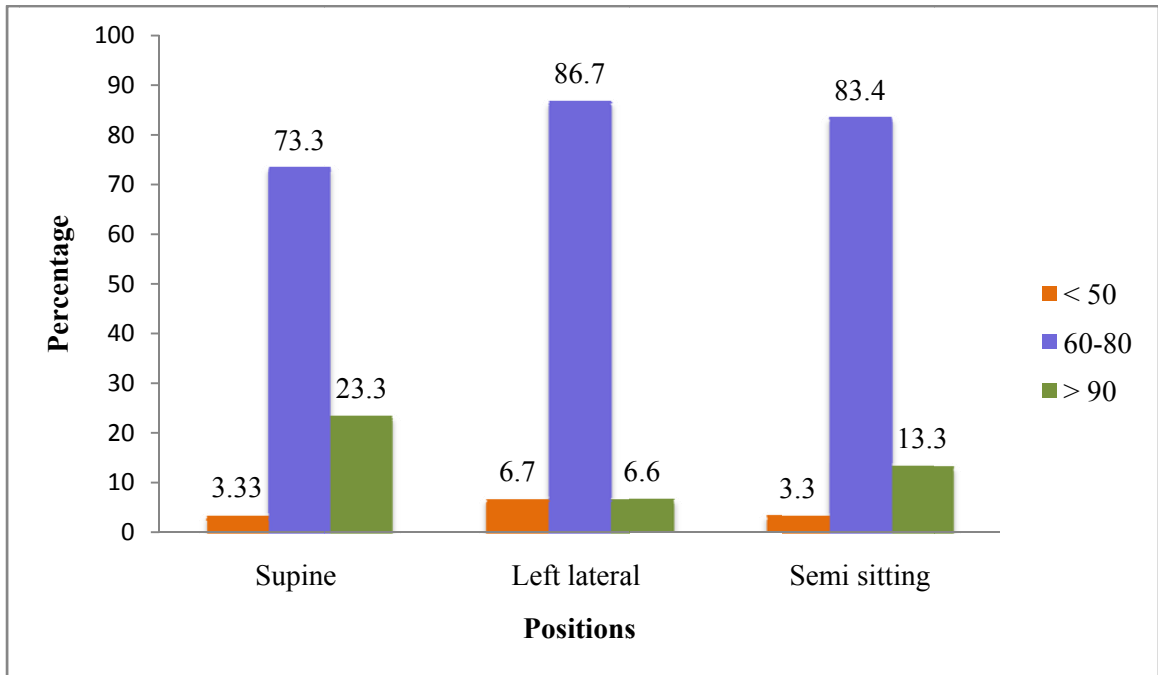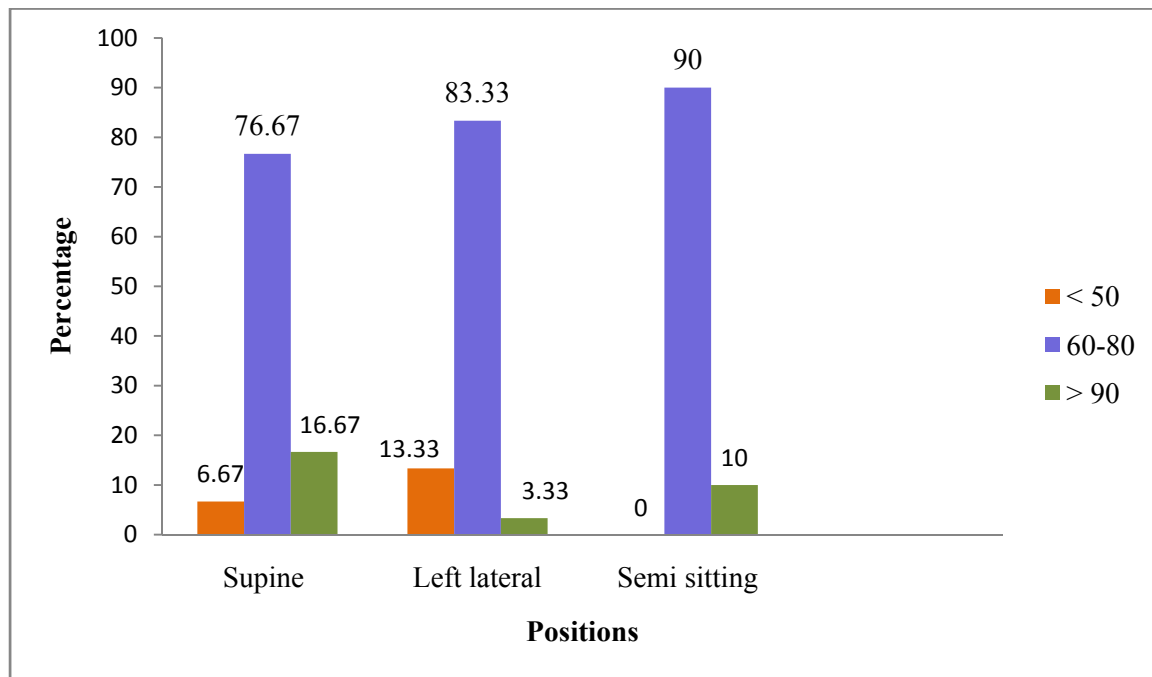
Figure 8: Percentage of sample in three positions according to diastolic pressure during non stress test

TABLE – VI

MEAN AND STANDARD DEVIATION OF PHYSIOLOGICAL PARAMETERS OF THE MOTHERS IN DIFFERENT POSITIONS BEFORE AND DURING NON STRESS TEST WITH LEVEL OF SIGNIFICANCE

N=90

S.No	Parameters	Supine position (n=30)		Left lateral position (n=30)		Semi sitting position (n=30)		F value P≤ 0.05
		Mean	SD	Mean	SD	Mean	SD	df = (3,2)
	BEFORE TEST							
1.	Pulse	79.6	6.65	78.57	7.07	81.67	7.86	1.44 NS
2.	Respiration	23.73	3.47	22.3	2.77	22.7	3.16	1.72 NS
3.	Systolic pressure	119.33	10.48	113.67	9.99	115.33	11.96	2.16 NS
4.	Diastolic pressure	78.67	11.67	71.67	11.77	75.67	11.65	2.17 NS
	DURING TEST							
1.	Pulse	79.53	6.66	79.07	6.78	80.4	7.82	2.72 NS
2.	Respiration	23.23	4.18	21.6	3.46	21.8	4.18	1.52 NS
3.	Systolic pressure	118.67	13.32	108.67	13.32	115	9.74	5.12 NS
4.	Diastolic pressure	76.67	12.95	67.33	12.02	75.33	9.37	5.73 NS

NS= not significant   table value = 9.55

Table 6 represents the mean score and standard deviation of samples in different positions during non stress test with level of significance

In all the three positions (supine, left lateral, semi sitting) the mean physiological parameters pulse and respiration of the mothers were normal without much variation, but the systolic and diastolic pressure showed slight variations. In before test systolic had 4-6mmHg variation and diastolic 3-7mmHg, during test systolic pressure had 3-10mmHg and diastolic pressure had 1-9. Statistically it shows there is no significant difference in the physiological parameters of the mothers in three positions before and during the non stress test

The table concludes that the mean physiological parameters (pulse, respiration, systolic & diastolic pressure) before and during test had no significant difference.

The hypothesis H_{02}: There is no significant difference in the mean pulse, respiration, and blood pressure of antenatal mothers before and during Non Stress Test in three different positions was accepted.

TABLE-VII

FREQUENCY AND PERCENTAGE DISTRIBUTION OF SAMPLES IN DIFFERENT POSITIONS BASED ON FETAL PARAMETERS DURING NON STRESS TEST

N=30

S. No	Physiological parameters	Supine		Left lateral		Semi sitting	
		F	%	F	%	F	%
1.	FHR in bpm						
	a) < 120	-	-	-	-	-	-
	b) 120-160	30	100	30	100	30	100
	c) > 160	-	-	-	-	-	-
2.	Movements						
	a) < 2	10	33.33	1	3.33	6	20,00
	b) 2	4	13.33	5	16.67	14	46.67
	c) >2	16	53.33	24	80.00	10	33.33
3.	Acceleration						
	a) <2	-	-	-	-	1	3.33
	b) 2	23	76.73	19	63.33	24	80.00
	c) >2	7	23.33	11	36.67	5	16.67

Table 7 represents the frequency and percentage distribution of samples in different positions based on fetal parameters during non stress test

In all the three positions (supine, left lateral. Semi sitting) the mother had normal fetal heart rate ranging from 120-160.

Fetal movement '2' is essential during the test. In supine position and left lateral position only 4-5 mothers (13.3 to 16%) had 2 fetal movements were observed, where in semi sitting position there was 14 mothers (46.67%) had normal fetal movements. Though there was more than 2 fetal movement were observed in all the three positions, the highest frequency was in left lateral position 24 mothers (80%) and the next in supine position 16 mothers (53.3%). Less than 2 movements were obtained maximum among 10 mothers (33.3%) in supine position.

Acceleration 2 is considered normal during the non stress test, In semi sitting position 24 mothers (80%) had normal acceleration. In supine 23 (76.73%) mothers and in left lateral position 19 (63.4%) mothers had normal accelerations. Though more than 2 acceleration were observed in all the three positions, a maximum of 11 mothers (36.67%) had more than 2 acceleration in left lateral position, only 5-7 mothers (16.6 &23.3%) seemed to have more than 2 acceleration in other positions.

Table conclude that in all the three position the mothers had more than 2 movements and accelerations. The fetal heart rate was normal.

Figure 9 highlights the percentage of sample in three positions according to fetal movements during non stress test

Figure 10 highlights the percentage of sample in three positions according to fetal accelerations during non stress test
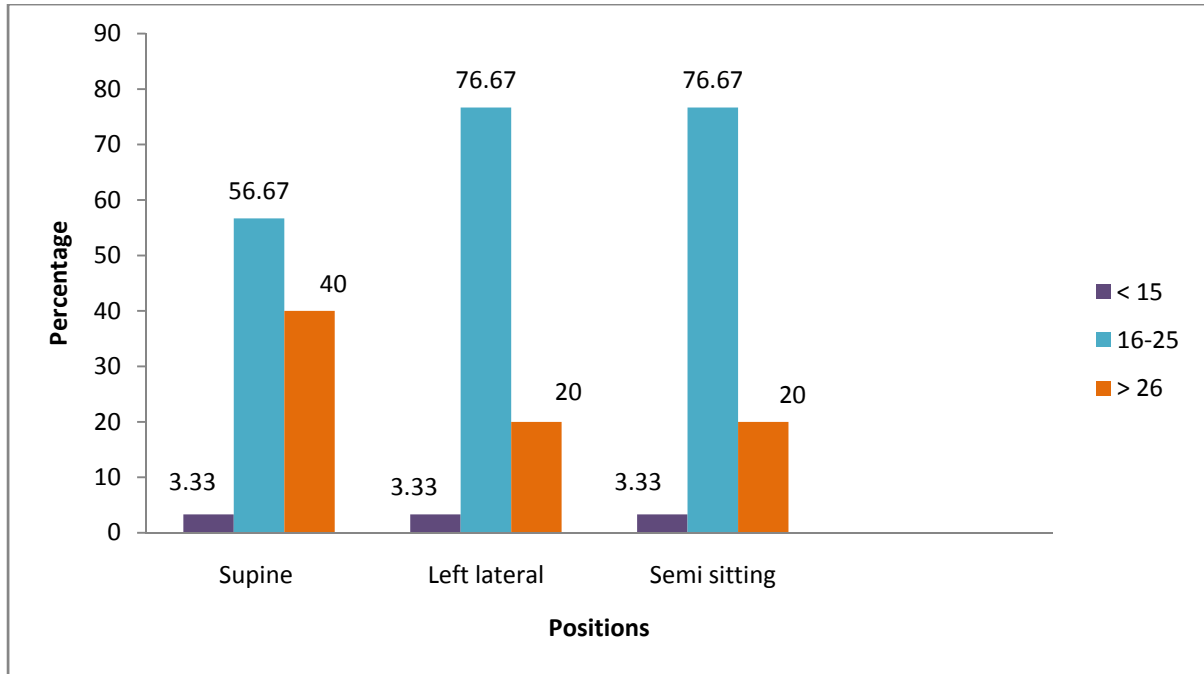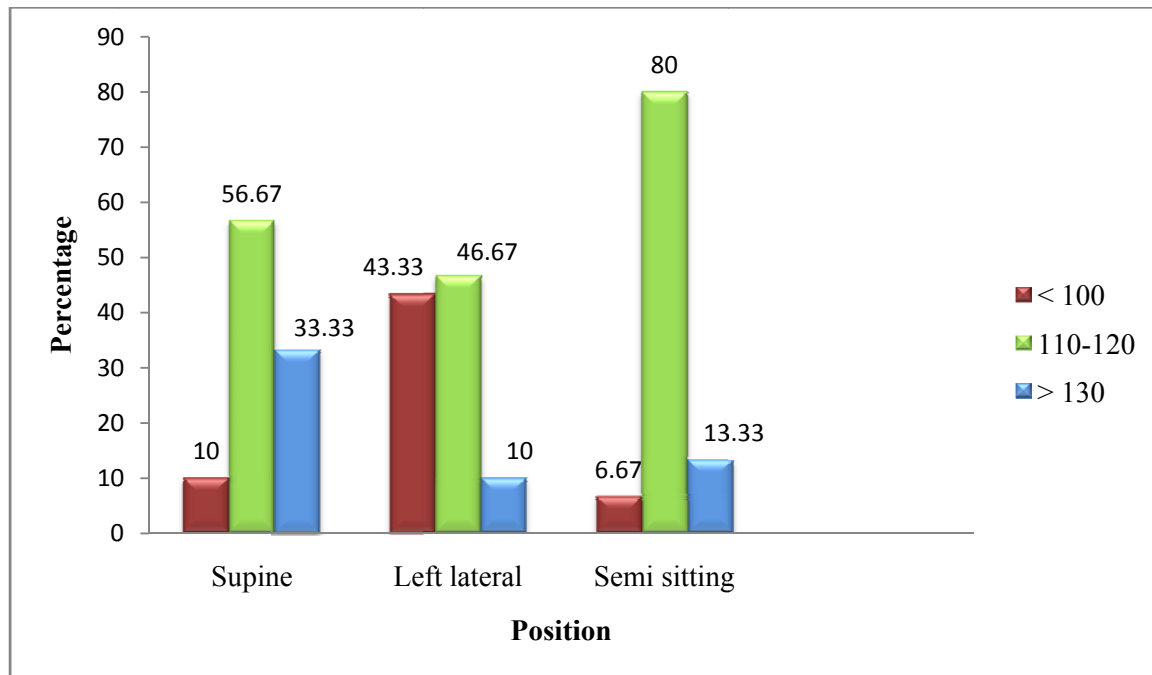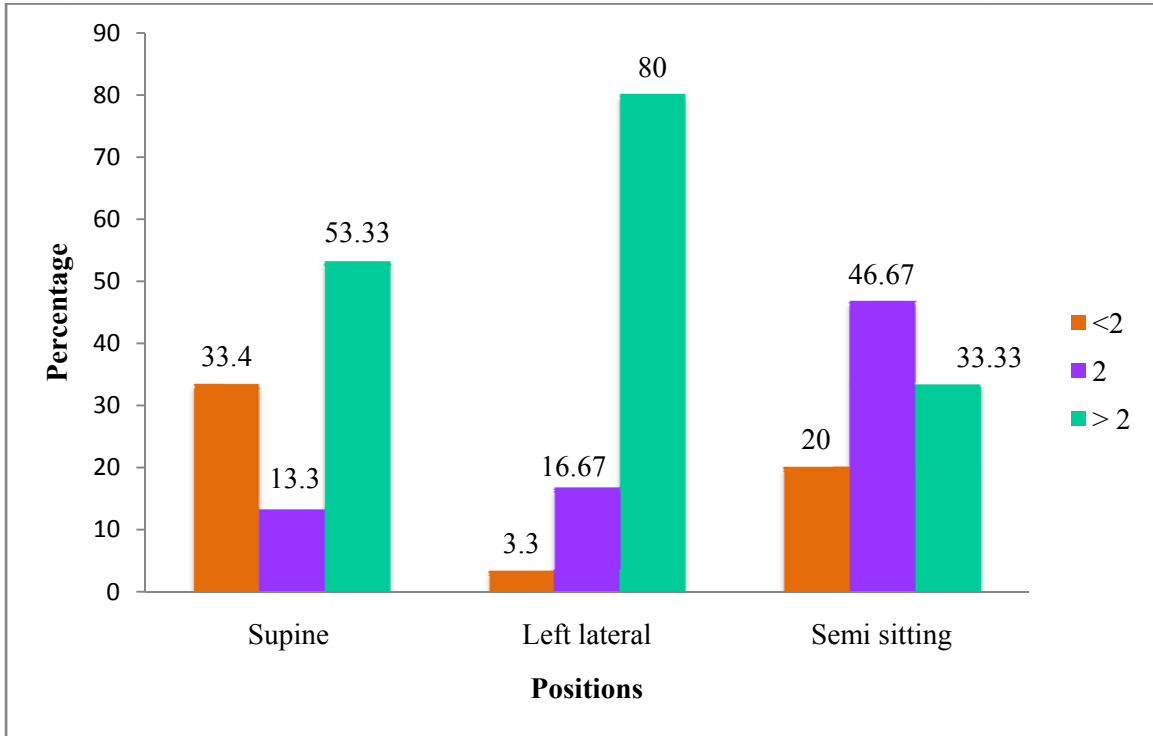
Figure 9: Percentage of sample in three positions according to fetal movements during non stress test
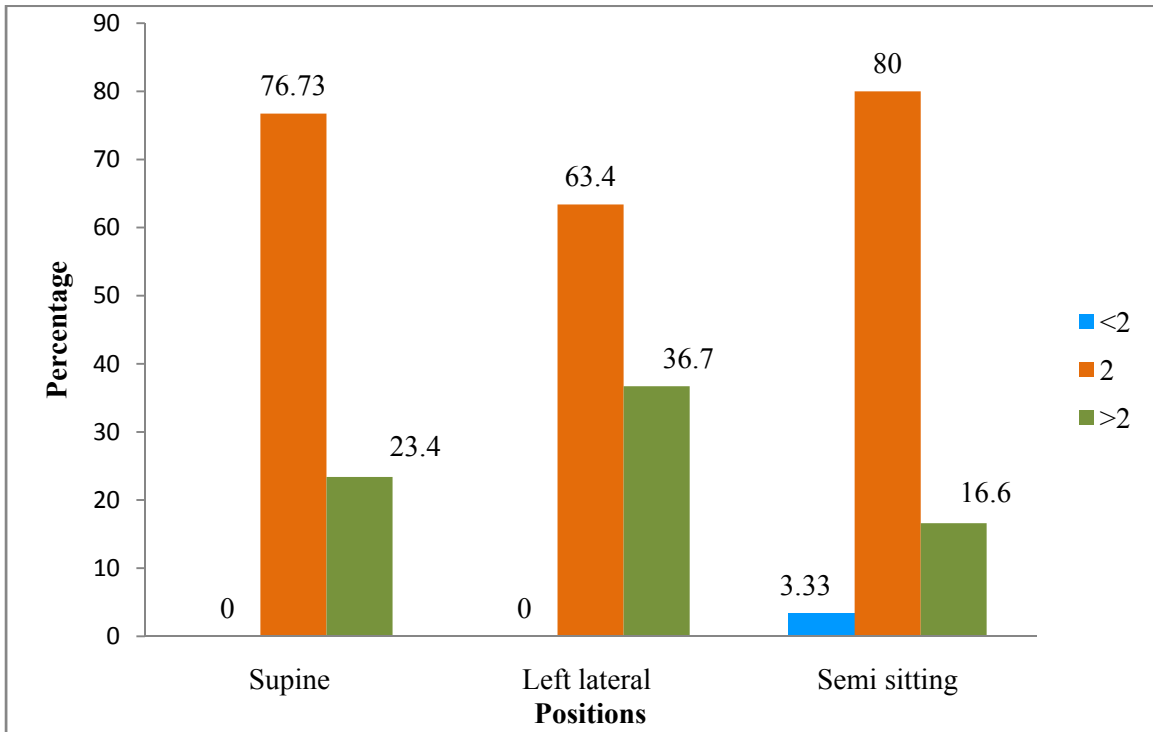
Figure 10: Percentage of sample in three positions according to fetal acceleration during non stress test

TABLE-VIII

MEAN SCORE AND STANDARD DEVIATION OF SAMPLES BASED ON FETAL PARAMETERS IN DIFFERENT POSITIONS DURING NON STRESS TEST WITH LEVEL OF SIGNIFICANCE

N=30

S. No	Parameters	Supine position (n=30)		Leftlateral position (n=30)		Semisitting position (n=30)		F value P≤ 0.05 df = (2,2)
		Mean	SD	Mean	SD	Mean	SD	
1.	FHR	141.33	7.77	142.73	6.84	140.73	6.49	0.38 NS
2.	Fetal movements	4.03	4.13	4.13	2.59	2.47	1.46	3.03NS
3.	Acceleration	1.67	1.12	2.97	1.56	1.87	1.008	7.98 NS

NS= not significant   **table value = 19**

Table 8 represents the mean score and standard deviation of samples based on fetal parameters different positions during non stress test with level of significance

In all the three positions the mean fetal heart rate ranged from 140-142.The mean score of the fetal movements in left lateral and supine positions were 4.03-4.13.

Comparatively in semi sitting position the mean score was 2.47. Compared with the other two positions in left lateral position the mean acceleration score were 2.97. In other two position supine and left lateral the mean score acceleration was 1.67 and 1.87 respectively.

The table concludes that the mean physiological parameters of fetus (fetal heart rate, movements, acceleration) during test had no significant difference.

The hypothesis H_{03}: There is no significant difference in the mean fetal heart rate, movement, and acceleration of the fetus during Non Stress Test in three different positions was accepted.

TABLE-IX

ASSOCIATION OF SELECTED DEMOGRAPHIC CHARACTERISTICS WITH LEVEL OF DISCOMFORT IN SUPINE POSITION DURING NON STRESS TEST

N=30

S. No	Demographic characteristics	Level of Discomfort								χ^2 P≤ 0.05	Table value Degree of freedom
		No		Mild		Moderate		Severe			
		F	%	F	%	F	%	F	%		
1.	**Age**										df = 6
	a) Below 20	2	40.00	1	20.00	2	40.00	-	-	1.494	tv =5.35
	b) 21-25	2	14.28	2	14.28-	5	35.71	5	35.71		
	c) Above-26	2	18.18	-		5	45.45	4	36.36	NS	
2.	**Gestational Age**										df = 3
	a) 38-39	2	18.18	-	-	6	54,55	3	27.27	1.29	tv=2.37
	b) 40-41	4	22.22	3	16.67	5	27.78	6	33.33	NS	
3.	**Abdominal Girth**										df = 6
	a) 90-99	2	50.00	1	25.00	1	25.00	-	-	1.782	tv=5.35
	b) 100-109	2	14.28	2	14.28	6	42.85	4	28.57	NS	
	c) Above 11	2	16.67	-	-	5	41.67	5	41.67		
4.	**Body Mass Index**										df = 3
	a) 20-24.9	5	41.67	1	5.88	4	33.33	3	25.00	3.35*	tv=2.37
	b) Above 25	1	5.89	2	11.76	8	47.05	6	35.29		

NS= not significant   * = Significant

Sample size of gestational age and body mass index = 29

Table 9 represents the frequency and percentage distribution of the demographic characteristics according to level of discomfort in supine position during non stress test

Age, gestational age and abdominal girth showed no association with the level of discomfort. A statistically significant association was seen between body mass index and level of discomfort. Mothers with a body mass index above 25 experienced significantly severe discomfort than mothers with body mass index 20-24.9

So the table concludes that the mothers felt more discomfort in supine position.

TABLE-X

ASSOCIATION OF SELECTED DEMOGRAPHIC CHARACTERISTICS WITH LEVEL OF DISCOMFORT IN LEFT LATERAL POSITION DURING NON STRESS TEST

N= 30

S.no	Demographic characteristics	Level of discomfort				χ^2 P < 0.05%	Table value Degree of freedom
		No discomfort		Mild discomfort			
		F	%	F	%		
1.	**Age**						
	a) Below 20	2	40.00	3	60.00		df = 2
	b) 21-25	10	71.42	4	28.57	0.98 NS	tv = 5.991
	c) Above-26	7	63.64	4	36.36		
2.	**Gestational Age**						
	a) 38-39	6	54.55	5	45.45	0.08 NS	df = 1
	b) 40-41	12	66.67	6	33.33		tv = 3.84
3.	**Abdominal Girth**						
	a) 90-99	2	50.00	2	50.00		df = 2
	b) 100-109	9	64.29	5	35.71	0.431 NS	tv = 5.991
	c) Above 11	8	66.67	4	33.33		
4.	**Body Mass Index**						
	a) 20-24.9	7	58.33	5	41.67	0.08 NS	df = 1
	b) Above 25	12	70.59	5	29.41		tv = 3.84

NS= not significant, Sample size of gestational age and body mass index = 29

Table- 10 represents the frequency and percentage distribution of the demographic characteristics according to level of discomfort in left lateral position during non stress test

There is no association found with demographic variables and level of discomfort in left lateral position. Sample size of gestational age and body mass index = 29

TABLE-XI

ASSOCIATION OF SELECTED DEMOGRAPHIC CHARACTERISTICS WITH LEVEL OF DISCOMFORT IN SEMI SITTING POSITION DURING NON STRESS TEST

N=30

S.No	Demographic characteristics	Level of discomfort						χ^2 P< 0.05	Table value Degree of freedom
		No		Mild		Moderate			
		F	%	F	%	F	%		
1.	**Age**								
	a) Below 20	4	80.00	1	20.00	-	-		df= 4
	b) 21-25	7	50.00	5	35.71	2	14.28	0.87 NS	tv = 9.488
	c) Above-26	4	36.36	5	45.45	2	50.00		
2.	**Gestational Age**								
	a) 38-39	5	45.45	4	36.36	2	18.18		df= 2
	b) 40-41	10	55.56	6	33.33	2	11.11	0.04 NS	tv= 5.99
3.	**Abdominal Girth**								
	a) 90-99	4	100.0	-	-	-			df = 4
	b) 100-109	7	50.00	4	28.57	3	21.43	3.48 NS	tv= 9.488
	c) Above 11	4	33.33	7	58.33	1	8.33		
4.	**Body Mass Index**								
	a) 20-24.9	5	41.67	6	50.00	1	8.33	0.38 NS	df= 2
	b) Above 25	9	52.94	5	29.41	3	17.64		tv = 5.99

NS= not significant

Sample size of gestational age and body mass index = 29

Table- 11 represents the frequency and percentage distribution of the demographic characteristics according to level of discomfort in semi sitting position during non stress test.

There is no association found with demographic variables and level of discomfort in left lateral position. Sample size of gestational age and body mass index = 29

CHAPTER-V
DISCUSSION

The study focused on assessing the physical (level of discomfort) and physiological parameters (pulse, respiration, blood pressure) of mothers and (fetal heart rate, movements, accelerations) of fetus before and during non stress test in different positions.

This chapter presents the main findings and its discussion.

Table I explains the demographic characteristics of the sample. Nearly half of the mothers 14 (46.47%) was in the age group of 21-25. The gestational age of 22 (73.33%) of the antenatal mothers was between 38-39 weeks. The abdominal girth of 14 (46.69%) mothers was between100-109 and 11 mothers (36.67%) was between110-119. The body mass index of 12 mothers (40%) had both in 20-24.9 and 25-29.9. Majority of mothers 18 (60%) had gravida 1 and 19 mothers (63.3%) had parity 0.

Analysis of level of discomfort in different positions

Table II explains the frequency and percentage distribution of samples according to level of discomfort in three different positions. In supine position 6 mothers had no discomfort, 3 (10%) had mild discomfort, 12 (40%) had moderate discomfort and 9 (30%) had severe discomfort. In left lateral position, 19 (63.33%) mothers had no discomfort; and11 mothers (36.6%) had mild discomfort. In semi sitting, 15 (50%) mothers had no discomfort, 11 (36.67%) had mild discomfort and 4 (13.33%) had moderate discomfort.

The comfort of mothers in three positions appears to be that, left lateral position was more comfort than compare with other two positions. Left lateral seems to be the most comfortable and mothers had less back pain also.

Alus M, Okumuş H, Mete S, et.al (2007), conducted a study to determine the effects of different maternal positions on non-stress test results and the preferences of mothers for involving positions. There were significant (P < 0.05) differences among four groups. Supine

position showed the least fetal reactivity. Qualitative data showed that pregnant women were least comfortable in supine position reporting back pain and shortening of breath.

Table III shows the mean discomfort score and positions adopted during non stress test. The mean discomfort score for all the positions ranged from 1.00 to 3.00; showing only a very little variation in the level of discomfort experienced in different positions. Analysis of variance shows that there is a significant difference in the level of discomfort and the positions adopted. The obtained "F" value is 19.314 which is greater than the table value (19.16) at 0.05 level at (2, 3) degree of freedom. The researcher accepts the hypothesis. H_1: There is a significance difference in the level of discomfort of mothers in three different positions during non stress test.

Analysis of physiological parameters of the samples (maternal & fetal)

Table IV explains the frequency of physiological parameters of the mothers before non stress test. In all the three position (supine, left lateral. Semi sitting) the mother had normal pulse rate ranging from 60-100. Most of the mothers had normal respiratory rate (16-25) in all the three positions. Comparatively more mothers 26 (86.67%) in left lateral position had normal respiratory rate, next in semi sitting position23 mothers (76.6%). Majority of the mothers had normal systolic pressure (110-120). 21 mothers (70.00%) in left lateral position had normal systolic pressure and 19 mothers (63.40%) in semi sitting position and in 17(56.6%) mothers in supine position had normal systolic pressure. Most of the samples in all the positions had normal diastolic pressure (60-90). 26 mothers (86.7%) had normal diastolic pressure in the left lateral position compare to the other positions semi sitting 25 (83.33%) and supine positions 22 (73.33%).

Table V explains the frequency of physiological parameters of the mothers during non stress test. In all the three position (supine, left lateral, Semi sitting) the mother had normal pulse rate ranging from 60-100. Left lateral position and semi sitting position 23 mothers (76.67%) had normal respiratory rate. Majority of the mothers had normal systolic pressure (110-120). 24 mothers (80%) in semi sitting position had normal systolic pressure, Compared to the other two positions left lateral position had 14 (63.40%) and in supine position had 17(56.6%). Most of the,

27 mothers (90%) had normal diastolic pressure in the semi sitting position. In other two positions mothers in left lateral had 25 (83.33%) and mothers in supine 23 (76.67%) had normal diastolic pressure.

Table VII shows the mean physiological parameters of mothers before and during non stress test. The mean physiological parameters (pulse, respiration, systolic & diastolic pressure) for all the position (supine, left lateral, semi sitting) of the mothers were normal without much variation, statistically it shows there is no significant difference in the physiological parameters of the mothers in three position before and during the non stress test. Analysis of the variance shows there is no significant difference in the physiological parameters before and during non stress test. The obtained "F" value for before test was ranging from 1- 2.5 and during test was 1.5-6 which is less than the table value (9.55). So the null hypothesis H_{01} is accepted. H_{01}: There is no significant difference in the mean pulse, respiration, and blood pressure of antenatal mothers before and during Non Stress Test in three different positions.

Table VII explains the frequency of physiological parameters of the fetus during non stress test. In all the positions the mother had normal fetal heart rate ranging from 120-160. In supine position and left lateral position only 4-5 mothers (13.3 to 16%) had 2 fetal movements were assessed. Though there was more than 2 fetal movement were assessed in all the three positions, the highest frequency was in left lateral position (24 mothers, 80%) and less than 2 movement were obtained maximum among 10 mothers (33.3%) in supine position.

Acceleration 2 is considered normal during the non stress test, majority of mothers in supine and semi sitting positions 23-24 (76.73%-80%) had normal acceleration. Though more than 2 acceleration were observed in all the three positions, a maximum of 11 mothers (36.67%) had more than 2 acceleration in left lateral position, only 5-7 mothers (16.6 &23.3%) seemed to have more than 2 acceleration in other positions.

Joseph M Miller MD, Alison Rodriguez MD, (2004), conducted a study to evaluate documentation of fetal heart rate accelerations by two methods. The standard non stress test was performed prior to the ultrasound evaluation.. When the non stress test was reactive, there is ≥15

beats per minute. But all nonreactive non stress tests were associated with an ultrasound response of 14 beats per minute or less.

Cherng-sa-ad, Y. Herabutya (2004), conducted a study to compare, the results of fetal movement count as performed by either the attending staff or by the patients using the non stress test (NST). The results showed that the best correlation between fetal movement count by the attending staff with non stress test as three or more fetal movements within 10 min and the best correlation between fetal movement count by patients with non stress test was found when ten fetal movements within two hours was used as a cutoff point. The result of this study suggests that the usefulness of fetal movement count performed either by attending staff or patients as a cheap and effective method of screening for good fetal well-being in places where non stress test is not readily available.

Daniels, S. M. and N. Boehm. (1991), conducted a study to determine whether there is a significant difference exists between the results of an electronically monitored non stress test (NST) and those of auscultation for single fetal heart rate acceleration, The McNemar's test for data analysis is used, in previous research which indicated that there was a significant difference between the two tests. The sensitivity (100%) and specificity (85.37%) of the auscultated acceleration test indicate that the test is valid in predicting the results of the non stress test and thus appears to be a valid screening tool for fetal well-being and may be a reliable alternative to the non stress test.

Table VIII the mean physiological parameters of fetus during non stress test. In all the position the physiological parameters of fetus was normal without much variation, statistically it shows there is no significant difference in the physiological parameters of the fetus in three positions during the non stress test. Analysis of the variance shows there is no significant difference in the physiological parameters of fetus during non stress test. The obtained "F" value for during test was 0-8 which is less than the table value (19). So the researcher accepted null hypothesis. H_{02}: There is no significant difference in the mean fetal heart rate, movements, and accelerations of fetus during non stress test in three different positions.

Table IX, X, XI shows the association of selected demographic variables with level of discomfort in three positions (supine, left lateral, semi sitting). **Table IX** shows the association of demographic variables with supine position. In supine position the body mass index has χ^2 value of 3.35 at 0.05 levels at 3 degree of freedom which is greater than the table value 2.37. So supine position seems to give more discomfort during non stress test compared to other two positions (left lateral and semi sitting). **Table X** and **XI** were the association of demographic data with left lateral and semi sitting. In left lateral and semi sitting positions there is no association with demographic variables.

CHAPTER- VI

SUMMARY, FINDINGS, CONCLUSION, IMPLICATION AND RECOMMENDATIONS

This chapter presents the summary, findings, conclusion, implication and recommendations of the study.

SUMMARY OF THE STUDY

The main aim of the study was to assess whether there was a significant difference in the physical and physiological parameters of the antenatal mothers and fetus while carrying out the non stress test during antenatal period in three different positions.

The conceptual framework of the study was based on the **Erensteine Widenbach Theory.** The research approach used in this study was descriptive survey approach. The variables of the study were maternal positions, parameters (physical, and pyhsiological) and non stress test. The research design used in this study was Quasi experimental cross over design with one group

The study was conducted in a selected hospital at Kollam, Kerala. The data was collected from a convenient sample of 30 antenatal mother's who were going through the procedure non stress test. For each mother the procedure was carried out in three different positions (supine, left lateral, semi sitting). The data was collected using a visual analogue discomfort scale, observational checklists and questionnaire. The level of discomfort was assessed during the procedure. The physiological parameters of mothers (pulse, respiration, blood pressure, fetal heart rate, movements and accelerations) were assessed using observational checklist. The data analyzed using descriptive and inferential statistics.

SUMMARY OF THE FINDINGS

Demographic characteristics

Nearly half of the 14 mothers (46.47%) were in the age group of 21-25. The gestational age of 22 mothers (73.33%) was between 38-39 weeks. The abdominal girth of 14 mothers (46.69%) was between100-109 and 11 (36.67%) was between110-119. The body mass index of mothers both in 20-24.9 and 25-29.9 were 12(40%). Majority 18 mothers (60%) had gravida 1 and 19 (63.3%) had parity 0.

Level of discomfort in different positions

Discomfort was assessed in 4 levels- no discomfort, mild, moderate and severe discomfort and in three positions (supine, left lateral, semi sitting). In all the three positions mothers experienced all the 4 levels of discomfort.

In supine position 6 mothers (20%), in left lateral 19 mothers (63.3%) and in semi sitting position 15 mothers (50%) did not experiencing discomfort.

Eleven mothers (36.67%) in left lateral and semi sitting position each and 3 mothers (10%) in supine position had only mild discomfort.

Moderate and severe discomfort was seen among 12 (40%) and 9 (30%) mothers respectively in supine position

The mean score of discomfort in supine position was 2.8, in left lateral 1.37 and in semi sitting 1.63.

Physiological parameters of the mother before and during non stress test

There was no change in pulse rate (60-100) in mothers before and during non stress test.

In supine position the mothers had no variations in respiration before and during the non stress test. In left lateral position, slight variation in normal respiration, before test 26 mothers (86.67%) had normal respiration and during 23 mothers (76.67%). In semi sitting position, only 1 mother (3.33%) had less than15 breath/minute during the test.

In supine position, there is no much variation in the systolic pressure before and during non stress test. But in left lateral and semi sitting positions good variation found in systolic pressure before and during test. In left lateral position 6 mothers (20%) had <110 systolic pressure before test but during 13 mothers (43.33%) had <110. Before test 21 mothers (70%) had normal systolic pressure but during test the frequency was changed 14 mothers (46.67%). In semi sitting position the normal systolic pressure before test was 19 (63.33%) and during test frequency were changed 24 (80%).

There is a slight variation in diastolic pressure before and during non stress test in three positions

Physiological parameters of fetus during non stress test

In all the three positions (supine, left lateral. Semi sitting) the mother had normal fetal heart rate ranging from 120-160. Compare with the other two position normal fetal movement found to be high in semi sitting position 14 (46.67%). In supine and left lateral positions the mothers had 4 and 5 respectively. More than 2 movements found to be high in left lateral position was 24 (80%). Normal fetal acceleration during the test was 2, in all the three positions the mothers had 2 accelerations.

Significant findings

There was a significant difference between the level of discomfort and positions of mothers during non stress test (F=19.314) at 0.05 level of significance, the table value was 19.16. Compare with the other two position the mean score was high in supine position (2.8)

There was no significant difference between the physiological parameters (pulse, respiration, blood pressure) of mother before and during non stress test (F value before test was ranging from 1- 2.5 and during test was 1.5-6) which is less than the table value (9.55) at 0.05 level at (3, 2) degree of freedom. There was no significant difference in the fetal parameters (fetal heart rate, movements, acceleration) during non stress test (F=0-8) which is less than the table value (19) at 0.05 level of significance.

There was significant association between the body mass index and level of discomfort in supine position (χ^2=3.35) at 0.05 level of significance at 3 degree of freedom. But in this study supine position seems to be more discomfort during non stress test compare with other two positions (left lateral and semi sitting). Mothers feel better comfort in left lateral position. In semi sitting position there is an early acceleration present with mild discomfort and short duration of non stress test.

CONCLUSION

The findings of the study conclude that the levels of discomfort during non stress test in supine position are high when compare with other two positions and the mothers felt back pain and dyspnoea in supine position. The left lateral position seems to be most comfortable position to the mothers during non stress test. Semi sitting position was identified as a superior position for conducting non stress test in a shorter period. Similarly, semi sitting position seemed to be mild discomfort and early acceleration shown. There is no difference in the physiological parameters like pulse, respiration, blood pressure, fetal heart rate, movements and acceleration of the mothers before and during non stress test.

LIMITATIONS

The investigator unable to control some variables such as the presence of the staff of the hospitals, previous experience, coping strategies, knowledge, physical and social environment.

IMPLICATION

The result shows that positions make difference in the level of discomfort during non stress test. But measures can be taken to reduce the perception of discomfort by giving different positions to the mothers according to their convince.There is no variations in the maternal and fetal parameters also. Similarly, mothers feel comfortable in left lateral position.

Nursing practice

Nurses can play a major role in discomfort management and in promoting comfort measures during non stress test. Literature says that non stress test done in left lateral as well as in semi sitting position will reduce the discomfort of the mothers. The findings of the study indicates that the mothers who undergone non stress test in supine position had severe discomfort while comparing with other two positions (left lateral and semi sitting positions). It may be lack of understanding on the part of nurses regarding the advantages of adopting various upright positions during non stress test. So health team members should be educated through in service education, continuing education, etc. To practice various positions for discomfort which will promote satisfactory experience for mothers. So this can be implemented in nursing practice.

Nursing education

The findings of the study suggest that the nursing students should be taught the various positions adopted for non stress test and educate the mothers regarding different positions. Nursing students can be given chances to practice different positions when they are performed non stress test during their obstetrical postings in the hospitals. Newer strategies related to fetal surveillance can be formulated and included in nursing curriculum.

Nursing Administration

The institutions and hospitals should develop and implement policies, guidelines regarding advantages of various positions during non stress test and care to be given to women in pregnancy. Nurse administrator can encourages the nurses to conduct projects related to fetal surveillance. Nurses can be given chances to attend the in-service education, conferences, workshop and panel discussions to update their knowledge on advancement in Obstetrics and Gynecological Nursing Research.

RECOMMENDATIONS

The findings of the study can be further developed as follows:

1. This study can be replicated on a larger sample for generalization of the findings.

2. A comparative study can be conducted between semi sitting position and standing position of the mothers subjected to non stress test.

3. A descriptive study can be conducted on knowledge of non stress test among pregnant mothers.

BOOK REFERNCE

1. Abdullah, F G. Levin E Better (1979) **Patient care through nursing research**, 7th edition. NewYork: Macmillian Publishing.

2. Alexander M. (2001), **Theory for midwifery practice**, 1st edition, Wales: Macmillan Publication.

3. Basavanthappa, B.T. (2007) **Nursing Theories**, 1st edition. New Delhi: Jaypee Brothers publication.

4. Basavanthappa, B.T. (2007) Nursing Research, 1st edition. New Delhi: Jaypee Brothers publication.

5. Basvanthappa, B.T. (2006) Text book of midwifery and reproduction health nursing, 1st edition, New Delhi: Jaypee Brothers Medical Publishers (P) Ltd.

6. Burns. N (1999) Understanding nursing research, 2nd edition. Phildelphia: WB saunders company.

7. Dasgupta (1999), Recent Advances in Obstetrics & Gynaecology, 4th edition, New Delhi, Jaypee Brothers (P) LTD,

8. Gupta, S.P (1996), Statistical methods, 2nd edition. New Delhi: Sultan Chand and sons publishers.

9. Jacob Annamma, (2005) A comprehensive text book of midwifery, Jaypee Company.

10. Kitzinger (1989) The complete book of pregnancy and childbirth, 1st edition, Newyork: Knopf.

11. Kothari. C.R (2000) Research Methodology, 2nd edition, New Delhi, Wishva Prakasan.

12. Littlelon Y.L, Engerbretson C. J. (2007) Maternity nursing care, 1st edition, US: Thomas Delmar Learning.

13. Mudaliar & Menon (2005), Clinical Obstetrics, 10th edition, New Delhi, Orient Longman (P) LTD.

14. Renu Misra, (2004),Electronic Fetal Monitoring, 1st edition, New Delhi, B.I.Publication (P) LTD,

JOURNAL REFERNCE

1. Bartfai,G , Kovacs L (1982), "Non stress test in an antenatal diagnosis", <u>Zentralbl Gynakol,</u> 104, 427-32.

2. Bhuvaneswari K, (2010), "Effect of different maternal positions on materno fetal biophysical parameters**"**, <u>Nightingale Nursing Times,</u> 4, 61-65.

3. Chang Y Lee, Bruce Druckker, (1979), "The non stress test for the antepartum assessment of fetal reserve", <u>American journal of obstetrics and Gynaecological Nursing,</u> 46, 116-131.

4. Chen G Y, Kuo CD, (1999),"Comparison of supine and upright positions on autonomic nervous activity in late pregnancy", <u>Journal of Anaesthesia,</u> 54, 215-19.

5. Devoe LD, Searle NS, (1985), "Clinical sequelae of the non stress test", <u>American journal of obstetrics and Gynaecological Nursing,</u> 51, 1074-78.

6. Ismail, Barrada, & et.al, (1979), "Antepartum fetal testing Non stress test", <u>American journal of obstetrics and Gynaecological Nursing,</u> 134, 76-82.

7. Keegan KA, & Paul, (1980), "Antepartum fetal heart rate testing-The non stress test as a primay approach", <u>American journal of obstetrics and Gynaecological Nursing,</u> 36,75-80.

8. Khan R & Kar MA, (2001), "Clinical assessment of intra uterine fetal wellbeing by non stress test<u>", JK Practitioner,</u> 8, 156-819.

9. Nathan, Ely B et.al, (2000), "Determine the effect of maternal position during non stress test", <u>American journal of obstetrics and Gynaecological Nursing</u> 182, 1070-1072.

10. Robert Brown & John Patrick, (1981), "The non stress test", <u>American journal of obstetrics and Gynaecological Nursing</u> 68**.**

11. Schifrin, BS, Foye G, (1979), "Routine fetal heart rate monitoring in the antepartum period", <u>Journal of obstetrics & Gynecology</u> 54, 21-24.

WEBSITE REFERENCE

1. Alus M, Okumus,(2007),**"The effect of different maternal positions on nonstresstest",**retrived on March16 from http://www.ncbi.nim.nih.gov/pubmed.

2. Cito G, Luissi S, (2005), **"Maternal position during non stress test & fetal heart rate pattern"**, retrived on November 10 from http://ukpmc.ac.uk.

3. Daniels SM, Boehm N, (1991), **"Auscultated fetal heart rate accelerations. An alternative to the non stress test"**, retrived on March 16 from http://www.ncbi.nim.nih.gov/pubmed.

4. Diana Cooper, (2010), **"Non reactive non stress test",** retrived on June 12 from http://www.brighthub.com.

5. Friedman, (2011), **"Auscultated fetal heart rate accelerations an alternate to the non stress test"**, retrived on January 6 from http://www.ncbi.nim.nih.gov/pubmed.

6. Glantz J, Christopher MD, (2011), "**Preterm non stress testing 10 beats compared with 15- beat criteria"** retrived on July from http://journals.lww.com.

7. Johnson TR, (1994), **"Maternal perception and Doppler detection of fetal movement",** retrived on february 4 from http://www.mendely.com.

8. Lawrence D, Devoe MD, (2008), **"Non stress test and contraction stress testing"**, retrived on November 14 from http://www.glown.com.

9. Merlinda, Hulya, (2007), **" Effects of different maternal positions during non stress test",** retrived on March 16 from http://lib.bioinfo.pl.com.

10. Mendenhall J, (1980), **"The non stress test the value of a single acceleration in evaluating the fetus at risk"**, retrived on April 20 from http://www.mendely.com.

11. Montan, (1985), "**Classification of the non stress test and fetal outcome",** retrived on March 18 from http://www.glown.com

12. Sakakibara. S, Chiba y , (1981), **"An evaluation of fetal movement during non stress testing"**, retrived on December 12, from http://www.ncbi.nim.nih.gov/pubmed.

13. Wirawat Piyamongal, (2006), **"Comparison of maternal stimulation test and non stress test",** retrived on September 9 from http://books-google.co.in.

14. Ware DJ, LD Devoe, (1994), **"The non stress test, reassessment of the gold standard",** retrived on June 12 from http://www.mendely.com.

LETTER REQUESTING PERMISSION TO CONDUCT THE STUDY

To

.

Respected Sir / Madam

Sub: Letter requesting permission for conducting the study.

30104624 is a post graduate nursing student of our institution. She has selected the below mentioned topic for her research project to be submitted to Dr.MGR Medical University of Health Science as a partial fulfillment of Master Nursing degree.

"A study to assess the effect of maternal positions on physical and physiological parameters of antenatal mothers and fetus during non stress test in a selected hospital at Kollam (dist), Kerala."

Regarding this project, she is in need of your esteemed help and co-operation as she is interested in conducting a study of her project in your hospital. I request you to kindly permit her to conduct the proposed study and provide her with the necessary facilities.

The student will furnish further details of the study if required personally. Please do the needful and oblige.

Thanking You

Yours Faithfully,

Place:

Date: Principal

R.V.S. COLLEGE OF NURSING

RVS INSTITUTE OF HEALTH SCIENCES

242-B, Trichy Road, Sulur, Coimbatore - 641 402.
Ph : 0422 - 2687421, 2687480, 2687603, Fax : 0422 - 2687604.
www. nursing.rvshs.ac.in
(Affiliated to the TN Dr. M.G.R. Medical University, Chennai
Recognized by the Indian Nursing Council, New Delhi.)

Mrs. Saramma Samuel
Principal

TÜVRheinland
85 100 001 08298

NABCB
QMS 010

**DINEN ISO 9001 : 2008
CERTIFIED INSTITUTION**

20.08.2011

Ref No :
To

Date............................

Sub: Permission to do research work – Reg.

Respected Sir / Madam,

Ms. Maneesha.M.S, II year M.Sc Nursing student of RVS College of Nursing has to perform a research study as a part of their curriculum.

The topic of her study is:

"A study to assess the effect of maternal positions on physical and physiological parameters of antenatal mothers and fetus during non stress test in a selected hospital Kollam (Dist), Kerala".

Therefore we humbly request you to grant her permission to do the study in your esteemed Hospital. We assure you that all details collected will be kept strictly confidential.

Thanking you

Yours faithfully,

20/8/11

**SARAMMA SAMUEL
PRINCIPAL
R.V.S. COLLEGE OF NURSING
242/B, TRICHY ROAD,
SULUR, COIMBATORE - 641 402**

Permitted

27/8/11

Dr. NARAYANA KURUP
Director
R.C.P.M. Hospital
Changankulangara
Oachira

APPENDIX – ii

PERMISSION LETTER FOR CONTENT VALIDITY

From

30104624

 II Year MSc Nsg

R.V.S College of Nursing,

Sulur, Trichi road, Coimbatore.

To

Through the Principal

Respected Madam / Sir

  Sub: Request for opinions and suggestions of experts for establishing content validity of research tool.

  I am a Master of Nursing student in RVS College of Nursing, Sulur in the Speciality of Obstetrics and Gynecological Nursing. As per the requirement for the partial fulfillment of the Master of Nursing degree under the Tamil Nadu Dr.MGR Medical University, I have selected the following topic for dissertation.

  "A study to assess the effect of maternal positions on physical and physiological parameters of antenatal mothers and fetus during non stress test in a selected hospital kollam (dist), kerala."

  "I humbly request you to kindly validate the tool and give your valuable suggestion.

<div align="center">Thanking You</div>

<div align="right">Yours sincerely</div>

<div align="right">30104624</div>

Enclosures: 1. Statement of the problem
      2. Objectives of the study
      3. Hypothesis of the study
      4. Research tool
      5. Criteria rating for validation
      6. Content validation certificate.

APPENDIX – iii

CERTIFICATE OF CONTENT VALIDITY

This is to certify that tool developed by Mr. 30104624, MSc (N) II year student, R.V.S. College of Nursing, Sulur, Coimbatore to collect data on the problem.

"A study to assess the effect of maternal positions on physical and physiological parameters of antenatal mothers and fetus during non stress test in a selected hospital kollam (dist), kerala." is validated by the undersigned and she can proceed with this tool to conduct the main study.

Name and Address:

Signature :

Seal :

Date :

APPENDIX-iv

CRITERIA RATING SCALE FOR VALIDATING THE BASELINE OBSERVATIONAL SCHEDULE TO ASSESS THE EFFECT OF MATERNAL POSITIONS ON PHYSICAL AND PHYSIOLOGICAL PARAMETERS OF ANTENATAL MOTHERS AND FETUS DURING NON STRESS TEST

Sl No	Items	Clarity	Relevancy	Adequacy	Remark
	SECTION – A **DEMOGRAPHIC DATA**				
1.					
2.					
3.					
4.					
	SECTION – B **OBSERVATION SCHEDULE FOR THE MATERNAL AND FETAL PARAMETRES**				
1.	Pulse				
2.	Respiration				
3.	Blood pressure				
4.	Fetal heart rate				
5.	Fetal movements				
6.	Number of Acceleration				

	SECTION – C OBSERVATION CHEKLIST SHOWING THE COMFORT OF THE MOTHERS				
1.	Breathing difficulty				
2.	Sweating				
3.	Shaking & lifting back				
4	Ask fluids during procedure				
5.	Listen to nurses instructions				
6.	Co-operate during procedure				
7.	Lying quite				
8.	Look Alert				
9.	Converse with others				
10.	Express the need for elimination				

Suggestions:

Name and Signature of Expert

REQUISITION LETTER FOR CO-GUIDE

From

> **30104624**
> II year M.Sc Nursing,
> RVS College Of Nursing,
> Sulur, Coimbatore.

To

> **Dr. Latha Prasanna**
>
> **Consultant Obstetrician and Gynecologist,**
>
> **RVS Hospital, Sulur**

Through the Principal

Respected sir

Sub   : Request for Co-Guide

    I wish to state that I am 30104624 M.Sc (N) II year student of RVS College Of Nursing. I have selected the below mentioned topic for dissertation as a partial fulfillment of the Master of Nursing Degree to the Tamil Nadu Dr. M.G.R Medical university.

    "A study to assess the effect of maternal positions on physical and physiological parameters of antenatal mothers and fetus during non stress test in a selected hospital Kollam (Dist), Kerala."

    Regarding this I am in need of your valuable help and cooperation by providing services to be a Co-Guide for my study.

    I request you to kindly consider the same favorable

               Thanking you,

                   Yours sincerely

                   30104624

DESCRIPTION OF THE TOOL

INTRODUCTION

Non stress test is an important procedure to assess the in utero fetal wellbeing. It is important, especially during the last trimester. In all the hospital the procedure was done in supine position, but the mothers felt more discomfort during the procedure because of the gravid uterus. Hence the investigator introduced two positions like left lateral and semi sitting positions for the Non stress test that will promote comfort for the mother when the procedure is performed

SECTION – A

With this tool am going to assess the characteristics of demographic variables such as age, LMP, EDD, gestational age, weight, height, BMI

DEMOGRAPHIC VARIABLE

1. Sample number
2. Age in years
   - Below 20
   - 21 – 25
   - 26 – 30
   - Above 30
3. Gestational Age
   - 36-38
   - 39-41
4. Abdominal Girth
   - 90-99
   - 100-109

110-120

Above 120

5. Weight

    50-59

    60-69

    70-79

    80 and above

6. Height

    145-150

    151-156

    157-162

    162 and above

7. BMI

    Less than 20

    20-24.9

    25-29.9

    Above 30

<div align="center">

SECTION—B

</div>

DISCRIPTION OF TOOL

This observation schedule gives an overall view of pulse, respiration, blood pressure, fetal heart rate, fetal movement, acceleration before and during Non stress test in each position

<div align="center">

OBSERVATIONAL SCHEDULE FOR ASSESSING MATERNAL AND FETAL PHYSIOLOGICAL PARAMETERS

</div>

PHYSICAL PARAMETERS	PRE TEST	DURING TEST
SUPINE POSITION		
Maternal parameters		
Pulse		
Respiration		
Blood pressure		
Fetal parameters		
FHR		
Fetal movement		
Number of acceleration		
LEFT LATERAL POSITION		
Maternal parameters		
Pulse		
Respiration		
Blood pressure		
Fetal parameters		
FHR		
Fetal movement		
Number of acceleration		
SEMI SITTING POSITION		
Maternal parameters		
Pulse		
Respiration		
Blood pressure		
Fetal parameters		
FHR		
Fetal movement		
Timing of acceleration		

SECTION – C

ASSESSMENT OF LEVEL OF DISCOMFORT OF THE MOTHERS DURING NON STRESS TEST IN THREE POSITIONS

DISCRIPTION OF TOOL

        The scale is used as, the mother, during the procedure cannot tell the discomfort. The researcher will evaluate the subjective response gives about the discomfort by the clients. This discomfort scale categorized (0-3) mild, (4-6) moderate, (7-10) severe discomfort along with the self report on observation of behavioral response.

VERBAL RESPONSE

Questionaire

1. How you feel during the procedure?

VISUAL ANALOGUE DISCOMFORT SCALE

0   1   2   3   4   5   6   7   8   9   10
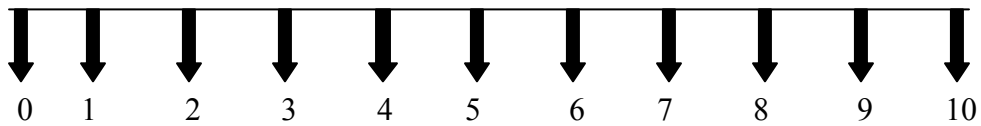
0   ➡ No Discomfort (lying quiet, co-operate during

                   Procedure)

1 - 3 ➡ Mild Discomfort (look alert, look tired)

4 - 6 ➡ Moderate Discomfort (mild dyspnea, wrinkling of forehead)

7 - 10 ➡ Severe Discomfort (severe dyspnea, sweating, shaking and, Lifting back)

APPENDIX- vii

Analysis of variance

Discomfort of mothers during non stress test

Parameters	Sun of squares	df	Mean Score	'F' value P<0.05 (3,2)
Between groups	57.96	2	28.98	
Within groups	130.53	87	1.5	19.314[*]
Total	188.49	89		

Physiological parameter (pulse) of the mother before non stress test

Parameters	Sun of squares	df	Mean Score	'F' value P<0.05 (3,2)
Between groups	149.49	2	74.74	
Within groups	4523.23	87	51.99	1.438 NS
Total	4672.72	89		

Physiological parameter (pulse) of the mother during non stress test

Parameters	Sum of squares	df	Mean Score	'F' value P<0.05 (3,2)
Between groups	27.47	2	13.73	
Within groups	4390.53	87	50.47	2.72 NS
Total	4418	89		

Physiological parameter (respiration) of the mother before non stress test

Parameters	Sum of squares	df	Mean Score	'F' value P<0.05 (3,2)
Between groups	34.07	2	17.03	
Within groups	862.03	87	9.91	1.72 NS
Total	896.1	89		

Physiological parameter (respiration) of the mother during non stress test

Parameters	Sum of squares	df	Mean Score	'F' value P<0.05 (3,2)
Between groups	47.62	2	23.81	
Within groups	1361.37	87	15.65	1.52 NS
Total	1408.99	89		

Physiological parameter (systolic pressure) of the mother before non stress test

Parameters	Sum of squares	df	Mean Score	'F' value P<0.05 (3,2)
Between groups	508.89	2	254.44	
Within groups	10230	87	117.59	2.16 NS
Total	10738.89	89		

Physiological parameter (systolic pressure) of the mother during non stress test

Parameters	Sum of squares	df	Mean Score	'F' value P<0.05 (3,2)
Between groups	1535.56	2	767.78	
Within groups	13043.33	87	149.92	5.12 NS
Total	14578.89	89		

Physiological parameter (diastolic pressure) of the mother before non stress test

Parameters	Sum of squares	df	Mean Score	'F' value P<0.05 (3,2)
Between groups	740	2	370	
Within groups	11900	87	136.78	2.71 NS
Total	12640	89		

Physiological parameter (diastolic pressure) of the mother during non stress test

Parameters	Sum of squares	df	Mean Score	'F' value P<0.05 (3,2)
Between groups	1528.89	2	764.44	
Within groups	11600	87	133.33	5.73 NS
Total	13128.89	89		

Physiological parameter (fetal heart rate) of the fetus during non stress test

Parameters	Sum of squares	df	Mean Score	'F' value P<0.05 (3,2)
Between groups	39.2	2	19.6	
Within groups	4460.4	87	51.27	0.38 NS
Total	4499.6	89		

Physiological parameter (fetal movement) of the fetus during non stress test

Parameters	Sum of squares	df	Mean Score	'F' value P<0.05 (3,2)
Between groups	52.42	2	26.21	
Within groups	751.9	87	8.64	3.03 NS
Total	804.32	89		

Physiological parameter (fetal acceleration) of the fetus during non stress test

Parameters	Sum of squares	df	Mean Score	'F' value P<0.05 (3,2)
Between groups	15.27	2	8.13	
Within groups	88.63	87	1.02	7.98 NS
Total	104.9	89		

RATHNAVEL SUBRAMANIAM COLLEGE OF ARTS & SCIENCE

(Autonomous)

NAAC Re-accredited & ISO 9001:2008 Certified Institution
Affiliated to Bharathiar University and approved by AICTE, New Delhi.

From   09th February 2012

    Dr. Sheila Jayaraj   Coimbatore

    Head, Department of English

    RVS College of Arts & Science

    Sulur, Coimbatore

To

    The Principal

    RVS College of Nursing

    Sulur, Coimbatore

Dear Madam,

       This is to certify that I have edited and corrected the thesis given to me by Maneesha M.S, II M.Sc. Nursing. The corrected copy is handed over to the said student accordingly.
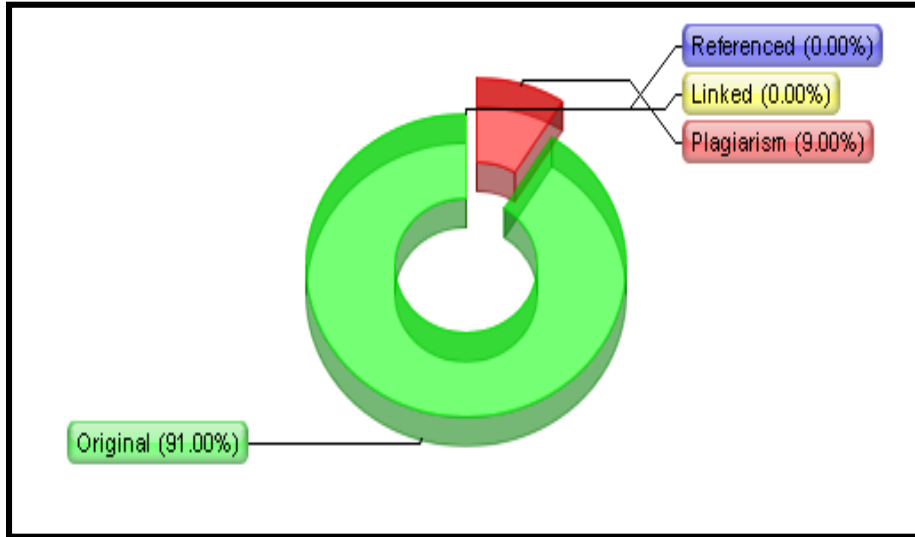
Yours sincerely,

Sheila Jayaraj

9/2/12

HOD of English
R.V.S. College of Arts & Science
Sulur P.O. COIMBATORE - 641 402

APPENDIX-ix

PLAGIARISM REPORT USING PLAGIARISM DETECTOR

Words#:	Source url:
185	http://www.changesurfer.com/Hlth/EFM.htm...
177	http://icpa4kids.org/Wellness-Research/a...
165	http://www.ncbi.nlm.nih.gov/pubmed/13587...

Report:

9.00% of the content matched plagiarized sources and 91.00% of the content is original.