A STUDY OF MATERNAL RISK FACTORS ASSOCIATED WITH DEVELOPMENT OF NEONATAL JAUNDICE

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CERTIFICATE BY THE INSTITUTION

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This is to certify that this dissertation entitled "**A STUDY OF MATERNAL RISK FACTORS ASSOCIATED WITH DEVELOPMENT OF NEONATAL JAUNDICE"- CROSS SECTIONAL STUDY** submitted by Dr. Soumya appearing for Part –II MS, Branch II of Obstetrics and Gynaecology Degree Examinations in May 2022 , is a bonafide record of work done by her, under my direct guidance and supervision as per the rules and regulations of the Tamilnadu Dr.MGR Medical University, Chennai , Tamilnadu , India . I forward this dissertation to the Tamil Nadu Dr.MGR Medical University, Chennai, India.

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DECLARATION

I , **Dr. Soumya** , solemnly declared that the dissertation titled , Study of maternal risk factors associated with development of neonatal jaundice" – Cross Sectional Study is a bonafide work done by me at R.S.R.M Lying in Hospital, Stanley Medical College Chennai during november 2020 to november 2021 under the guidance and supervision of **Prof. Dr. V. Rajalakshmi, MD, DGO**, Prof and Head of Department , Obstetrics and Gynaecology . The dissertation is submitted to the Tamil Nadu Dr. MGR Medical University, in fulfillment of the university rules and regulations for the award of the M.S Degree in Obstetrics and Gynaecology.

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CONTENTS

INTRODUCTION

Neonatal jaundice is the most common cause of neonatal admission in the hospital. About 5%-10% of babies have clinically significant jaundice requiring phototherapy. Neonatal jaundice if not treated immediately, will lead to fatal complications like kernicterus –it is a Bilirubin encephalopathy causing brain damage and long term neurological impairment in the newborn. Various maternal factors contribute to the development of neonatal jaundice. A thorough knowledge of these maternal Factors is necessary for early identification, assessment and treatment of neonatal jaundice.

Neonatal jaundice include both Physiological and pathological jaundice. About 80% of preterm newborns and 60% of term Newborns will develop neonatal jaundice. Neonatal jaundice is due to excess bilirubin in the Blood. Bilirubin is the breakdown product of red blood cells in the spleen. Bilirubin is water insoluble. It is transported from spleen to liver by binding with albumin. In the liver bilirubin is conjugated with glucuronic acid .Conjugated bilirubin is excreted through bile into the intestine where it is converted into urobilinogen. 10%-20% of urobilinogen is reabsorbed from the Intestine creating enterohepatic circulation. This recycled urobilinogen may be re – excreted into the bile by liver or into the kidney by urine. The remaining urobilinogen is excreted in urine

REVIEW OF LITERATURE

PREVALENCE

Neonatal jaundice occurs in one in two infants globally. Hyperbilirubinemia is the most common problem occurring in neonates. The overall incidence of neonatal jaundice as reported by various Indian workers varies from 54.6% to 77%. Jaundice occurs when liver cannot clear sufficient amount of bilirubin from the plasma. Adults appear jaundiced when serum bilirubin level exceeds 2 mg%. But neonates appear jaundiced when serum bilirubin level Exceeds 5mg%. Pathological jaundice occurs in 4-8% of newborn.

- During the past decades, researchers have made significant progress in understanding the epidemiology of neonatal jaundice. . RansomeKuti 1972,Effionget al 1975, and Coulter et al 1977 reported a lower incidence of neonatal jaundice among the Hausas (Northern Nigeria) compared to the Yoruba‘s (Western Nigeria) and Igbo‘s (Eastern Nigeria) in their series and deals with neonatal jaundice in predominantly Igbo population. This study also concluded that neonatal jaundice is a common paediatric problem in various parts of Nigeria.

- Dr B.S.B, Wood (1978) reported that breastfeeding was associated with a two fold increase in jaundice and also that multivariate analysis confirmed breast feeding as an independent factor associated with increased jaundice.

- Louise Friedmalet al (1980)) reported that breast feeding as an independent factor has small effect and less than that of oxytocin, sex of baby, epidural anesthesia and gestational age.

- KhuramArifet al (1998) employed logistic regression model with estimation of odds ratio in the analysis of risk factors and spectrum of neonatal jaundice in a birth cohort in Karachi, Pakistan. Data was analyzed using SPSS Version 6.1, out of 5570 birth during the study period, the number of newborn requiring phototherapy and / or exchange transfusion of blood was 869 (15.6/ 1000 live births) with a male to female ratio 1:1.3, the mean gestational age and birth weight were 37.2 ± 2.8 weeks and 2754 ± 735 g respectively. Glucose 6 phosphate dehydrogenase deficiency accounted for 2% of the study group.

- Yoshihiro Maruoetal in ―Association of Neonatal Hyperbilirubinemia with Bilirubin UDP Glucuronosyl transferase Polymorphism‖ concluded that the missense mutation causing g71r is the first reported polymorphism for ugt1a1, and the mutation is a risk factor for nonphysiologic neonatal hyperbilirubinemia. The high incidence of hyperbilirubinemia in the Japanese may be attributable to the high frequency of this missense mutation.

- Shu-Chiung Chou etal (2001) in ―Management of newborns: measuring performance by using a benchmarking model‖. The logistic regression revealed that the risk of developing a maximum observed TSB ≥ 20 mg / dl was positively associated with lower gestational age, male gender and older maternal age. Also poison regression revealed that the incidence of severe hyperbilirubinemia (TSB ≥ 20 mg / dl) was associated positively with lower gestational age and male gender. HosmerLemeshow goodness of fit test was used to examine the model where p = 0.312. Thomas etal (2002) used logistics multivariate regression analysis technique to study the prediction and prevention of extreme neonatal hyperbilirubinemia in mature health maintenance organization. The study showed

that the strongest predictors of neonatal jaundice were family history jaundice in newborn with or = 6.0, maternal age of 25 or older (or = 3.1), lower gestational age (or = 0.6 / week).

- The use of herbal medications in association with severe neonatal jaundice had been reported previously from Lagos, Southern Nigeria .Olusanyaetal., 2009 explored that significantly, mothers of the newborn babies with significant bilirubinaemia took herbal drugs.

- Eneh and Ugwu(2009), Oladokunetal ., (2009),Owa and Ogunlesi, (2009) reported that unlike the developed countries where feto-maternal blood group incompatibilities are the main causes of severe neonatal jaundice, it is mostly prematurity, G6PD deficiency, infections as well as effects of negative traditional and social practices such as consumption of herbal medications in pregnancy, application of dusting powder on baby, use of camphor balls to store babies clothes are the majorcauses in developing countries.

- Onyearugha C. N etal (2011)reported a high prevalence of neonatal jaundice in Abakaliki, Southeast Nigeria and recommended that effective and sustained health education of the citizenry and particularly expectant women on the need forearly booking for ANC, regular antenatal supervision of pregnancy and delivery in appropriate health facility, as well as on early signs of NNJ and prompt presentation of affected newborn for appropriate medical care be implemented forthwith to curb this unacceptable situation.

- Ezham, A.et al (2011) in ―Prevalence of Uridine Glucuronosyl Transferase 1A1 (UGT1A1) Mutations in Malay neonates with severe jaundice‖, discovered that out

of 250 neonates that were enrolled in the study, one hundred and twenty-five neonates of Malay ethnic parentage were admitted with severe unconjugated hyperbilirubinemia. They found that there was an equal distribution of gender between the severely jaundiced neonates and the control cases. Review of Related Literature on treatment of Neonatal Jaundice Gibbs W.N etal (1979) in ―Glucose-6-phosphate dehydrogenase deficiency and neonatal jaundice

DEFINITION OF NEONATAL JAUNDICE

Neonatal jaundice is yellowish discolouration of the Skin, sclera and conjunctiva of neonates due to elevated level of Unconjugated bilirubin level in blood. It is of two types.

1.Physiological jaundice.

2.Pathological jaundice.

Neonatal hyperbilirubinemia is defined as total serum bilirubin level above 5mg/dl.

PHYSIOLOGICAL JAUNDICE

Physiological jaundice does not develop within 72 hrs after birth. The level of rise in serum bilirubin is less than 5mg/day. The peak bilirubin level does not exceeds 15mg/dl. The Level of direct bilirubin is less than 10% of total bilirubin. It resolves within one week in term neonates and within two weeks in preterm Neonates. It does not usually requires any treatment.

PATHOLOGICAL JAUNDICE

Pathological jaundice manifests within first 24hrs of life. The rise in bilirubin level is >0.5mg/dl/hr. The peak bilirubin value exceeds 15mg/dl. Level of direct bilirubin is more than 10% oftotal bilirubin. It does not resolve spontaneously. If it is not treated immediately it may lead to fatal complications like kernicterus. Kernicterus is the bilirubin

encephalopathy affecting brain which is Fatal and it may lead to long term neurological complications like Hearing problems, gaze problems, cerebral palsy and neuromotor Symptoms.

Jaundice develops due to excess lysis of red blood cells in The blood stream and inadequate excretion of bilirubin by liver

CAUSES OF NEONATAL JAUNDICE

Based on causes it is of two types

1.Hemolytic jaundice

2.Non-hemolytic jaundice

1.HEMOLYTIC JAUNDICE

RH INCOMPATIBILITY

RH incompatibility occurs when Rh negative pregnant mother is exposed to Rh positive fetal red blood cells secondary to fetomaternal haemorrhage during the course of pregnancy from spontaneous or induced abortion ,trauma, invasive procedures or normal delivery. It produces hemolytic jaundice in the newborn .It manifests as jaundice within 24 hrs of birth in newborns.

ABO INCOMPATIBILITY

It is the maternal-fetal blood group incompatibility producing hemolytic disease of newborn. It is common in newborns with type A blood. It does not produce clinically significant intrauterine hemolytic anaemia as in RH Incompatibility. However, it produces jaundice in the newborns.

GLUCOSE 6 PHOSPHATE DEHYDROGENASE DEFICIENCY

Glucose 6 phosphate dehydrogenase enzyme deficiency disorder is the X – linked inherited disorder. G6PD enzyme is responsible of red cell membrane. Its deficiency produces disruption of red cell membrane stability resulting in hemolysis.

One third of neonates with G6PD deficiency will develop jaundice .It is common in specific regions of India like Orissa. It produces neonatal jaundice and chronic non spherocytic hemolytic anaemia. It produces severe pathological jaundice , hence early diagnosis is necessary for appropriate management.

THALASSEMIA

Thalassemia is an inherited blood disorder affecting the body to produce normal red blood cells. Symptoms will not appear until 6 months due to presence of fetal haemoglobin. It produces severe life threatening anaemia within first two years of life. Its symptoms depend on the type of mutation. Babies with beta- thalassemia major have severe anaemia requiring exchange transfusion.

HEREDITARY SPHEROCYTOSIS

Hereditary spherocytosis is a heterogenous disorder in which abnormalities of red blood cell structural proteins lead to loss of erythrocyte membrane surface area, resulting in spherical-shaped, hyperdense ,poorly deformable red blood cells with a shortened life span. It is the leading cause of direct antiglobulin test negative hemolytic anaemia requiring erythrocyte transfusion in the first month of life. Early suspicion, prompt diagnosis and treatment will prevent adverse outcomes in neonates with hereditary spherocytosis.

NON-HEMOLYTIC ANAEMIA

PREMATURITY

Babies born before 37 weeks of gestation will have increased susceptibility of neonatal jaundice. About 80% of preterm newborns have increased susceptibility of neonatal jaundice. This is due to immaturity of hepatobiliary system to metabolise the bilirubin produced from the breakdown of red blood cells. It usually produces physiological jaundice which usually manifests in second or third day of life.

CEPHALOHEMATOMA

Cephalohematomas are caused when pressure on baby's head during vaginal birth damages or ruptures small blood vessels in the scalp. When blood

accumulates in a cephalohematoma the red blood cells breaks down which eventually increases the bilirubin level in the blood resulting in neonatal Jaundice.

POLYCYTHEMIA

Infants with polycythemia will have increased red cell mass which leads to increased load of bilirubin precursors in the blood resulting in neonatal jaundice. Neonatal polycythemia maybe active(increased bone marrow erythropoiesis) or passive(red blood cell transfusion). It is usually due to normal fetal adaptation to fetal hypoxia instead to haematopoietic stem cell abnormalities.

It is common in newborn born post term or small for gestational age, babies of hypertensive or diabetic mothers, twin-twin transfusion syndrome and those with chromosomal abnormalities. Polycythemia is also increasingly seen in newborn of mothers with placental insufficiency**.**

BREAST MILK JAUNDICE

About 2-4% of breastfed term infants have jaundice in excess of 10mg/dl beyond third-fourth week of life. A diagnosis of breast milk jaundice if other causes of prolonged jaundice like inadequate feeding, continue hemolysis, extravasated blood ,G6PD deficiency and hypothyroidism have been ruled out. Mothers are advised to continue breastfeeding at frequent intervals and TSB levels usually decline over a period of time. Some babies may require phototherapy.

BREASTFEEDING JAUNDICE

Breastfeeding jaundice usually appears between 24-72 hr of age ,peaks by 5-15 days of life and disappears by third week of life. This increased frequency of jaundice in breastfed babies is not related to characteristics of breast milk but rather due to inadequate breastfeeding.

Ensuring optimum breastfeeding would help decrease this kind of jaundice.

INBORN ERRORS OF BILIRUBIN METABOLISM

Hereditary or inborn errors of metabolism may

Produce conjugated or unconjugated hyperbilirubinemia.

- UNCONJUGATED HYPERBILIRUBINEMIA – Crigler-Najjar

  Syndrome, Gilbert syndrome, and primary shunt Hyperbilirubinemia syndrome.

- CONJUGATED HYPERBILIRUBINEMIA –Dubin-Johnson syndrome

  and Rotor syndrome.

Among these inborn errors of metabolism Crigler-Najjar Syndrome produce significant jaundice requiring phototherapy Or liver transplantation. Treatment is usually unnecessary in Other disorders.

SEPSIS

Sepsis produces variety of symptoms including jaundice In the newborns. This is due to increased cytokines release which disrupts the normal bilirubin metabolism in the body resulting in jaundice.

IDIOPATHIC

Idiopathic neonatal jaundice should be considered ,When all other causes of neonatal hyperbilrubinemia are ruled out.

FACTORS THAT INFLUENCE EPIDEMIOLOGY OF NEONATAL JAUNDICE

ETHNICITY

Infants of southeast and far asian descent have on average higher total serum

SEASON

Lee et al. studied about seasonal variations in neonatal jaundice and found that neonatal jaundice was more common in summer than in winter.

FAMILY

Lower birth order and an older sibling with neonatal Jaundice have both been shown to be associated with increased risk of neonatal jaundice.

GENETICS

Familial factors discussed above and inborn errors of Metabolism have shown genetic susceptibility in the development of neonatal jaundice.

EVENTS DURING PREGNANCY

MATERNAL SMOKING

Lee et al. showed that maternal smoking was significantly Associated with reduced incidence of both hemolytic and non-hemolytic jaundice.

Several mechanisms for this effect has been suggested, but no direct experimental evidence for these appearsto be published.

MATERNAL ILLNESS

A higher incidence of neonatal jaundice is associated with maternal diabetes, pregnany-induced hypertension, maternal obesity and first trimester bleeding.

MATERNAL PHARMACOTHERAPY

Drugs may induce liver enzymes. Drugs like Phenobarbital when given to pregnant women may induce bilirubin metabolism in liver. Infants born to HIV positive

mothers who had taken 6 weeks course of nevirapine is found to have lower incidence of neonatal jaundice.

BLOOD GROUP INCOMPATIBILITY

The incidence of Rh isoimmunization has declined significantly since the advent of Rhesus prophylaxis in pregnancy, However it remains an important cause of neonatal morbidity and mortality. Among less common blood group incompatibilities Kell, s, C, Jka, S, Lub, and N isoimmunization cause significant hemolytic jaundice in newborn.

LABOUR AND DELIVERY

Several events related to labour and delivery such as placenta praevia, placental abruption, PROM, prolonged labour, breech presentation, forceps, vacuum, caesarean section, epidural anaesthesia and cephalohematoma increases the risk of neonatal jaundice.

PROLONGED DURATION OF LABOUR

Prolonged duration of labour was found to be a determinant factor for neonatal jaundice. This might be attributed to bruising and swelling of the scalp of newborns due to the excessive pressure applied by birth attendants as management for prolonged labour which in turn increases the risk of jaundice by increasing bilirubin level in the blood. It may also be due to the clinical relationship between longer labour with cephalohaematoma and subgaleal haemorrhage which is a known determinant factor for Neonatal jaundice and/or severe hyperbilirubinaemia.

GESTATIONAL AGE

Lower gestational age increases the risk of neonatal jaundice. Thus, for each week of gestation below 40 weeks the risk of neonatal jaundice increase significantly.

BIRTH WEIGHT

Low birth weight is also associated with increased risk of neonatal jaundice.

GENDER

The risk of neonatal jaundice is increased in male newborns compared to females.

NUTRITION

Infants with feeding difficulties exclusive breast feeding was a risk factor for neonatal jaundice, whereas exclusive breast feeding was protective among infants with no report of feeding difficulties.

MECONIUM RETENTION

Corchia et al. showed that delayed first passage of meconium is associated with increased risk of neonatal jaundice.

INFECTION

Neonatal jaundice on rare occasions may be presenting symptom of sepsis and infection like UTI. This is due to sepsis might cause haemolysis of red blood cells an hepatic dysfunction that leads to accumulation of serum bilirubin in the body.

SEX OF THE BABY

Sex of the baby is an important determinant of neonatal jaundice. male newborns have relatively immature liver which may not be able to process all the bilirubin formed from red blood cells in normal condition. Besides, a male has a higher concentration of bilirubin and hige risk of acute bilirubin encephalopathy as compared with females

BIRTH ASPHYXIA

Birth asphyxia was also an important determinant of neonatal jaundice . In a study conducted in Iran it was found that the odds of neonatal jaundice were 2.88 times more likely among neonates with birth asphyxia than neonates without birth asphyxia. Different studies conducted in Kerala India, Southern Nigeria and Southeastern Nigeria supported that neonatal jaundice was influenced by birth asphyxia.

- This might be due to the fact that asphyxia is an insult to the newborn due to lack of oxygen, lack of perfusion to various organs which results in multiorgan system dysfunction due to hypoxic damage mainly on brain, lung, liver and intraventricular haemorrhage which affect the bilirubin conjugation ability of the liver that results in

jaundice. Also, perinatal asphyxia with hypoxic-ischaemic encephalopathy can lead to disruption of the blood-brain barrier, thereby allowing free entry of the unconjugated bilirubin to the neurons resulting in acute bilirubin encephalopathy. Besides, kidney damage from perinatal asphyxia can lead to less excretion of the conjugated bilirubin, thereby causing conjugated hyperbilirubinaemia and jaundice.

HYPOTHERMIA

Hypothermia was an important determinant of neonatal jaundice. This might be due to the fact that prolonged cold injury mainly moderate and severe hypothermia leads to oedema, general haemorrhage (especially pulmonary haemorrhage) which produces excess bilirubin that increases unconjugated serum bilirubin level.

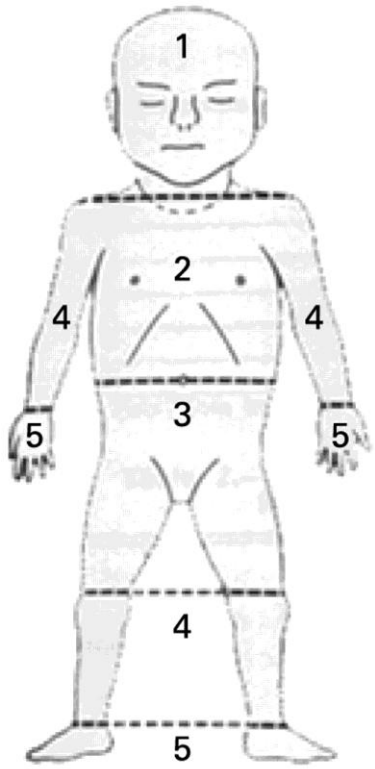
APPROACH TO A JAUNDICED NEONATE

All the neonates should be visually inspected for jaundice every 12 hrs during initial 3 to 5 days of life. Transcutaneous bilirubin can be used as an aid for initial screening of jaundice. The following investigations are done to confirm the level of jaundice and cause of jaundice.

- Total serum bilirubin.
- Blood groups of mother and baby.
- Peripheral smear – evidence of hemolysis.
- Direct Coombs test – detects presence of antibody coating on fetal RBCs.
- Haematocrit- decreased in hemolysis.
- Reticulocyte count- increased in hemolysis.
- G6PD levels in RBC.
- Sepsis screen.

- Thyroid function tests.
- Urine for reducing substances to rule out galactosemia
- Specific enzyme/genetic studies.

The above investigations can also be used to assess treatment for jaundice



Grade	Extent of jaundice
0	None
1	Face and neck only
2	Chest and back
3	Abdomen below umbilicus to knees
4	Arms and legs below knees
5	Hands and feet

Figure 1: visual inspection of jaundice and grading according to kramers rule

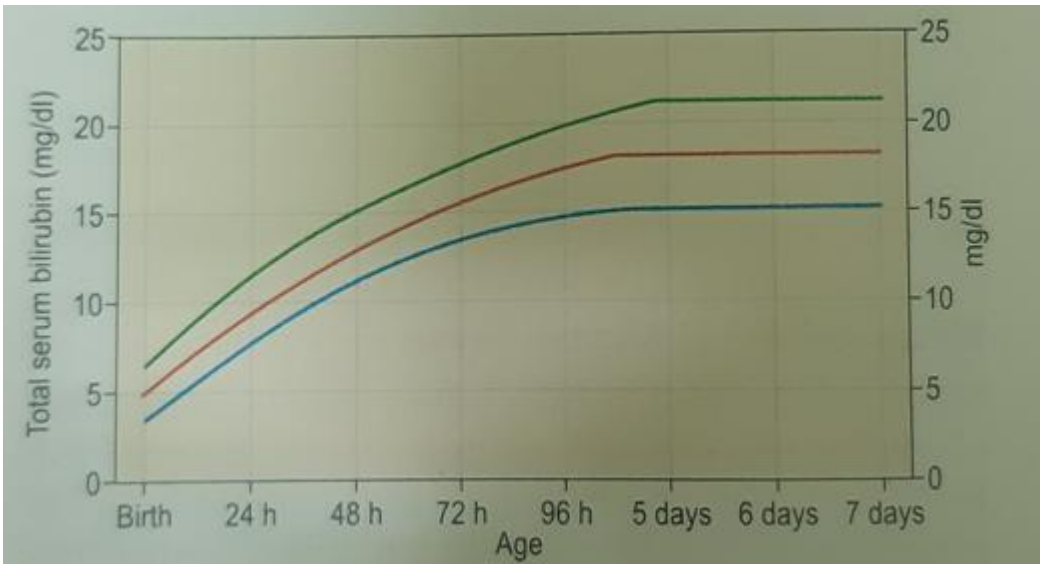
Figure 2: transcutaneous bilirubinometer for estimation of serum bilirubin.

MANAGEMENT OF NEONATAL JAUNDICE

Any newborns with signs of serious jaundice should be started on phototherapy. The following are the signs of serious jaundice

- Presence of visible jaundice in first 24 hrs.
- Yellow palms and soles anytime.
- Signs of acute bilirubin encephalopathy or kernicterus: hypertonia, abnormal posturing, convulsions, fever, high pitched cry.

If the above signs are not present but measurement of serum bilirubin is in phototherapy range ,phototherapy can be started**.**



The above picture indicates guidelines for starting phototherapy in term newborns.

- Green line indicates term infants(>38 weeks) with lower risk.
- Red line indicates term infants(>38 weeks) with risk factors.
- Blue line infants at higher risk (35-37 6/7 week+ risk factors)

PHOTOTHERAPY

Phototherapy remains the mainstay of treating neonatal jaundice. It acts by converting insoluble bilirubin into soluble isomers that can be excreted in urine and feces.

The bilirubin molecule isomerizes to harmless forms under blue-green light (460-490 nm). Phototherapy acts by several ways

- Configurational isomerizations.
- Structural isomerizations.
- Photo oxidation.

Phototherapy can be discontinued once two TSB values 12 hr apart fall below current age specific cut offs.

EXCHANGE TRANSFUSION

Double volume exchange transfusion should be performed if the total serum bilirubin levels reach to age specific cut –off for exchange transfusion or the infant shows sign of bilirubin encephalopathy irrespective of total serum bilirubin levels.

FOLLOW UP

Infants will total serum bilirubin levels >20 mg/dl and those who require exchange transfusion should be followed up for neurodevelopmental outcome. Hearing assessment (BERA) should be done at 3 months of age.

COMPLICATIONS OF NEONATAL JAUNDICE

ACUTE COMPLICATIONS

KERNICTERUS

Kernicterus or bilirubin encephalopathy is bilirubin induced neurological damage typically in infants. Regions commonly affected include basal ganglia, hippocampus, geniculate bodies an cranial nerve nuclei such as oculomotor, vestibular and cochlear. The cerebellum can also be affected .

Bilirubin –induced neurological dysfunction (BIND) refers to clinical signs associated with bilirubin toxicity. It includes hypotonia followed by hypertonia or opisthotonus or retrocollis.

The followings are the symptoms of kernicterus

- Lethargy or drowsiness.
- Fever ,a shrill high-pitched cry.
- Absence of certain reflexes

Affected infants eventually develops respiratory distress, mild to severe muscle spasms or diminished muscle tone.

In most cases syndrome characteristic of kernicterus develop by three to four years of age. As age advances some infants will develop ataxia, dystonia, athetosis or dysarthria.

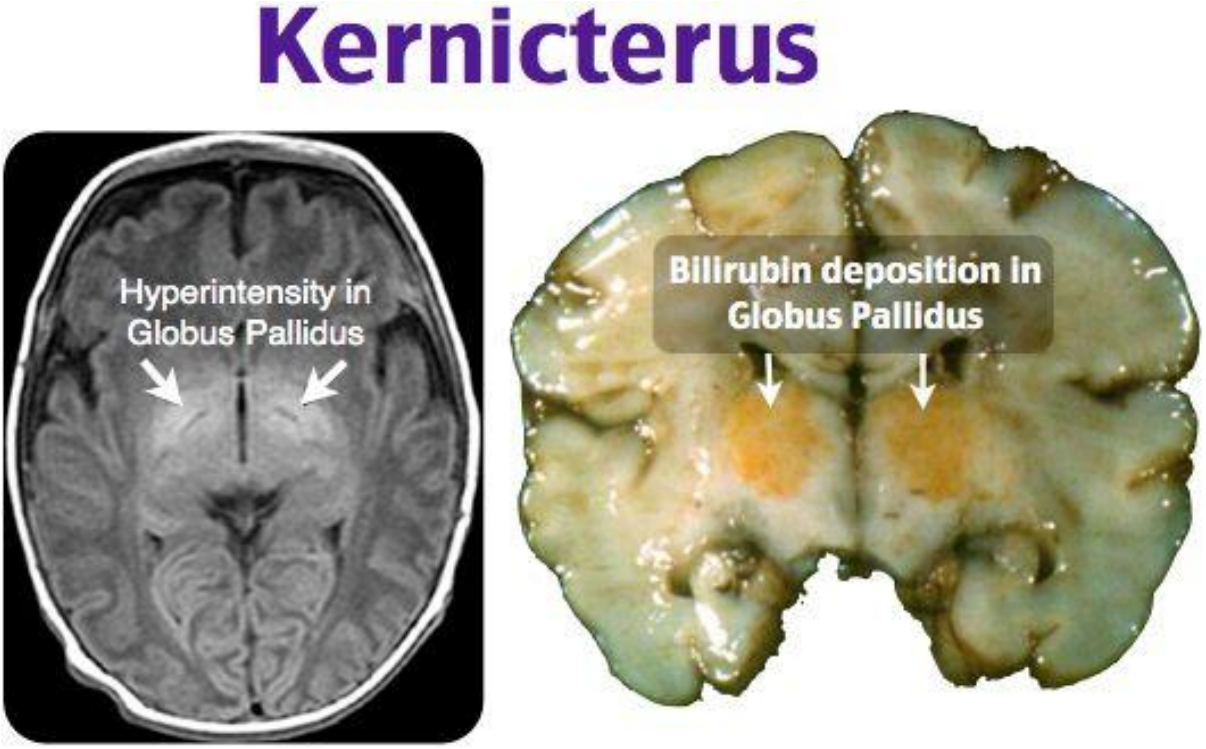


Figure 3: bilirubin deposition in the brain

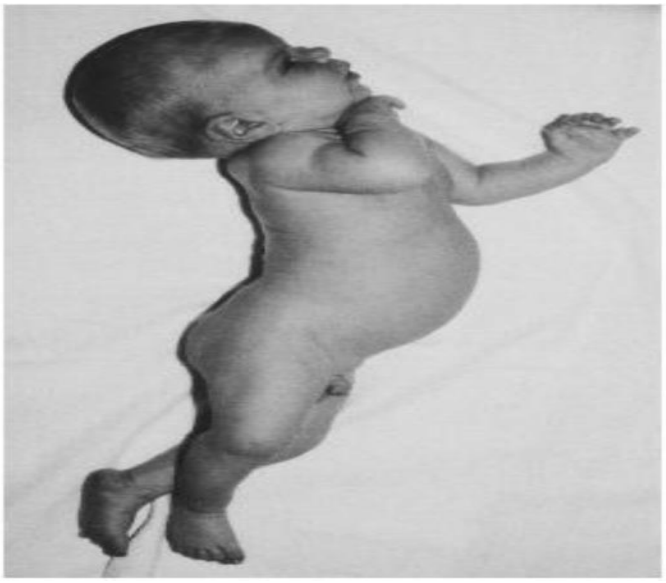


Figure 4: back arching and opisthotonus in a 1 month old neonate with kernicterus

TREATMENT OF KERNICTERUS

Aim of the treatment is to reduce the level of unconjugated bilirubin level in the blood.

Early treatment is imperative to prevent the complications of kernicterus.

Treatment includes exchange blood transfusions in which small amounts of blood are withdrawn repeatedly and replaced with blood from a donor. Another treatment option include plasmapheresis in which affected babies blood is separated from plasma ,the plasma is then replaced with other human plasma and blood is transfused into affected individual.

Phototherapy and adequate breast feeding are additional treatment modalities used in the treatment of jaundice in kernicterus.

Other treatment is symptomatic and supportive.

CHRONIC COMPLICATIONS OF JAUNDICE

Full term newborns with moderate neonatal jaundice ,including those with no clinical sequelae at discharge is found to have increased risk of minor neurological dysfunction, motor and developmental disturbances.

The following are some of the complications found to develop in babies with neonatal jaundice.

- Mental retardation
- Infantile cerebral palsy
- Developmental delay
- Speech or language disorders
- Dysarthria
- Hearing loss
- ADHD
- ASD

Hence early diagnosis is required for adequate management and prevention of chronic complications of neonatal Jaundice.

MEASURES TO PREVENT DEVELOPMENT OF NEONATAL JAUNDICE

ANTENATAL MEASURES TO PREVENT NEONATAL JAUNDICE

- Antenatal investigation should include maternal blood group testing.
- In case of Rh negative mother with Rh positive father Anti D injection should be given after first obstetric event like abortions, delivery, invasive technique like amniocentesis and chorionic villous sampling.
- Rh positive baby born to Rh negative mother is at higher risk of neonatal jaundice. Hence monitored adequately.
- Antenatal mothers with risk factors like diabetes mellitus and gestational hypertension should be monitored and treated accordingly.

INTRAPARTUM

- In case of delivery in Rh negative mother cord blood sample is collected to perform newborns blood grouping and direct coombs test. This helps in early identification and treatment of hemolysis in newborn.

POST NATAL MEASURES TO PREVENT NEONATAL JAUNDICE

- Mothers should be advised to breastfed their babies 8-12 times a day in the first few days.
- A programme for breastfeeding support should be established in every health care institution that manages deliveries with continuation in primary care.
- In every newborn that develops jaundice in the first 24 hrs of life TSB level should be measured within a maximum of 2 hr. If the level does not reach threshold for treatment ,then measurements are made every 6 hr until the level is below treatment threshold, either stable or falling.
- If jaundice is detected in a newborn after 24hrs post birth, the bilirubin level should be measured as soon as possible.
- The cause of jaundice should be investigated in newborns requiring intensive phototherapy.
- Measurement of the G6PD level is recommended in every jaundiced newborn whose family history or ethnic origin suggest the likelihood of this deficiency or in any newborn with poor response to phototherapy.
- Perform urinalysis and urine culture in jaundiced newborn to rule out sepsis.

AIM OF THE STUDY

The aim of this study is to identify the maternal risk factors that the newborn susceptible for development of neonatal jaundice.

MATERIALS AND METHODS

STUDY DESIGN

Cross sectional study.

PERIOD OF STUDY

November 2020 to November 2021.

PLACE OF STUDY

Govt. RSRM Lying in Hospital, Chennai.

CASE SELECTION

All women in postpartum period with live term newborns. Newborns are screened for jaundice by visual inspection and total serum bilirubin. Observation of antenatal, intrapartum records of mother whose newborn require intervention phototerapy. Then perform General physical examination and blood indices of mothers of newborn with neonatal jaundice.

INCLUSION CRITERIA

All postpartum mothers with term newborns.

EXCLUSION CRITERIA

All postpartum mothers with preterm newborn

METHOD OF STUDY

Postpartum mothers are selected according to criteria and their newborns are examined for jaundice by visual examination and serum bilirubin. Newborns who require intervention phototherapy are categorized and antenatal, intrapartum records of these mothers are observed. Mothers of newborn with jaundice are then examined physically and blood investigations are sent.

HISTORY

In these postpartum mothers with newborns having neonatal jaundice relevant history such as age, parity, menstrual history, obstetric history , gestational hypertension, gestational diabetes mellitus, hypothyroid, anaemia treatment or other medical illness well obtained. Details of delivery such as augmentation of labour, mode of delivery are obtained.

PHYSICAL EXAMINATION

Detailed physical examination with regards to weight, height were recorded. They were examined for anaemia , pedal edema and Systemic examination of cardiovascular system, respiratory system and central nervous system was done.

LAB INVESTIGATIONS

- Hb
- Total count
- Platelets

STATISTICAL ANALYSIS

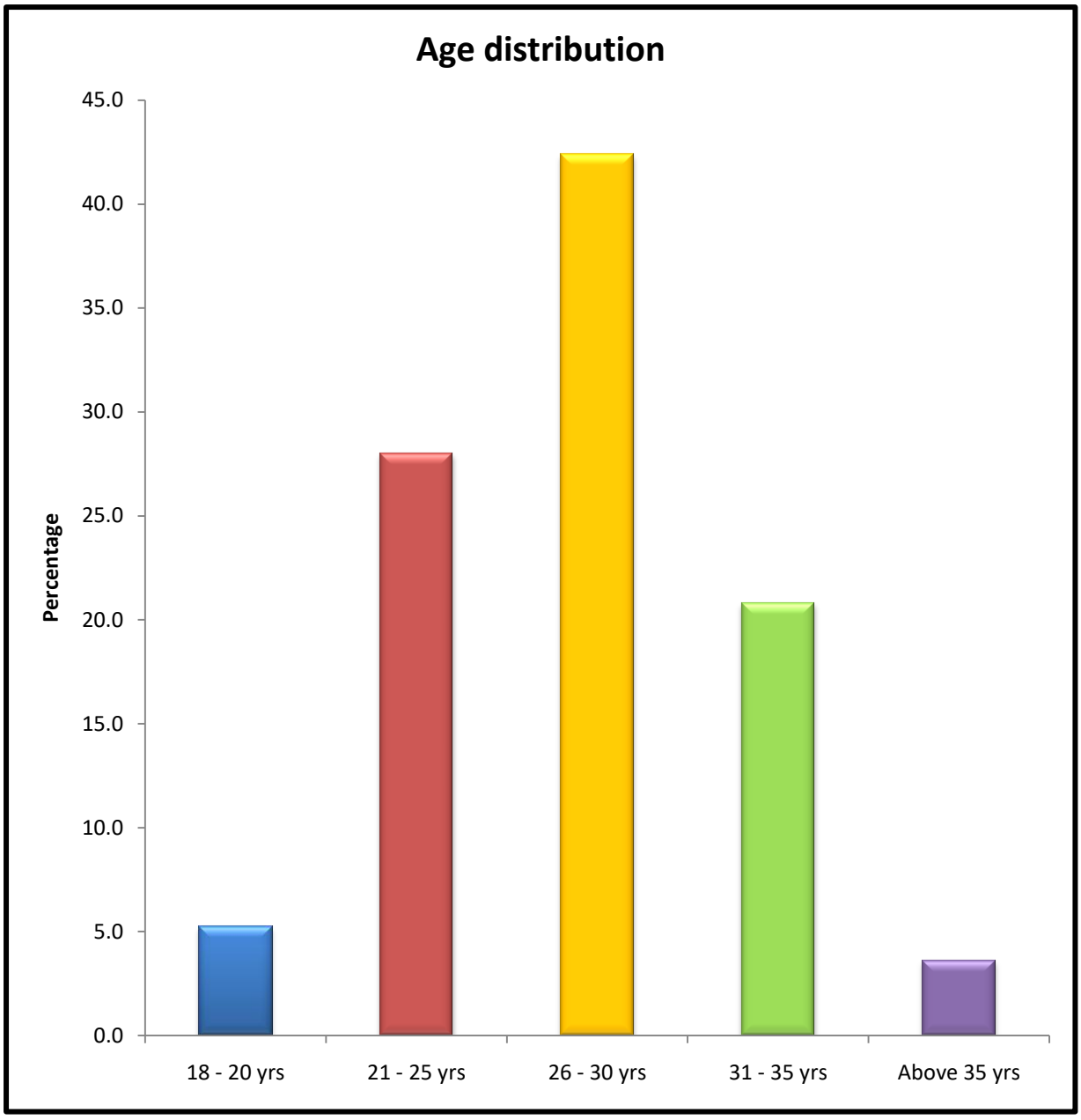
Association between neonatal jaundice and maternal risk factors were evaluated using chi-square and student t test and statistical significance was deemed at a p value of < 0.05. 0dd's ratio was calculated expressing the relationship between neonatal jaundice and maternal risk factors.

DATA ANALYSIS

The sample size is 250 numbers of post partum women whose neonates developed jaundice requiring intervention phototherapy. These postpartum mothers are evaluated and examined to find the risk factors that leads to development of neonatal jaundice.

MATERNAL AGE DISTRIBUTION

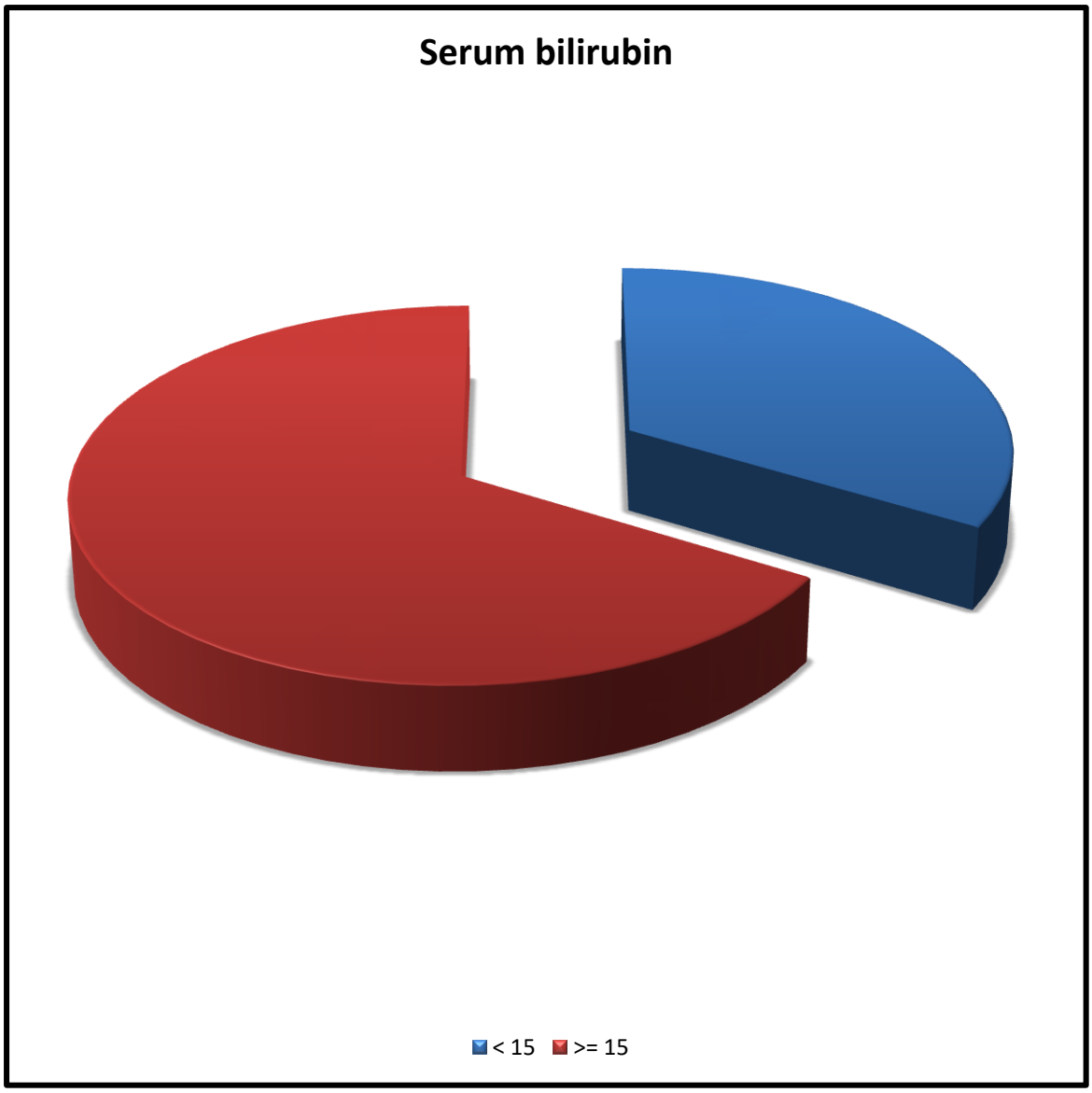
Age distribution		
AGE IN YEARS	Frequency	Percent
18 - 20 yrs	13	5.2
21 - 25 yrs	70	28.0
26 - 30 yrs	106	42.4
31 - 35 yrs	52	20.8
Above 35 yrs	9	3.6
Total	250	100.0



The above table shows Age distribution were 18-20 years is 5.2%, 21-25 years is 28.0%, 26-30 years is 42.4%, 31-35 years is 20.8%, >35 years is 3.6%.

Serum Bilirubin

Serum bilirubin		
	Frequency	Percent
< 15	84	33.6
>= 15	166	66.4
Total	250	100.0

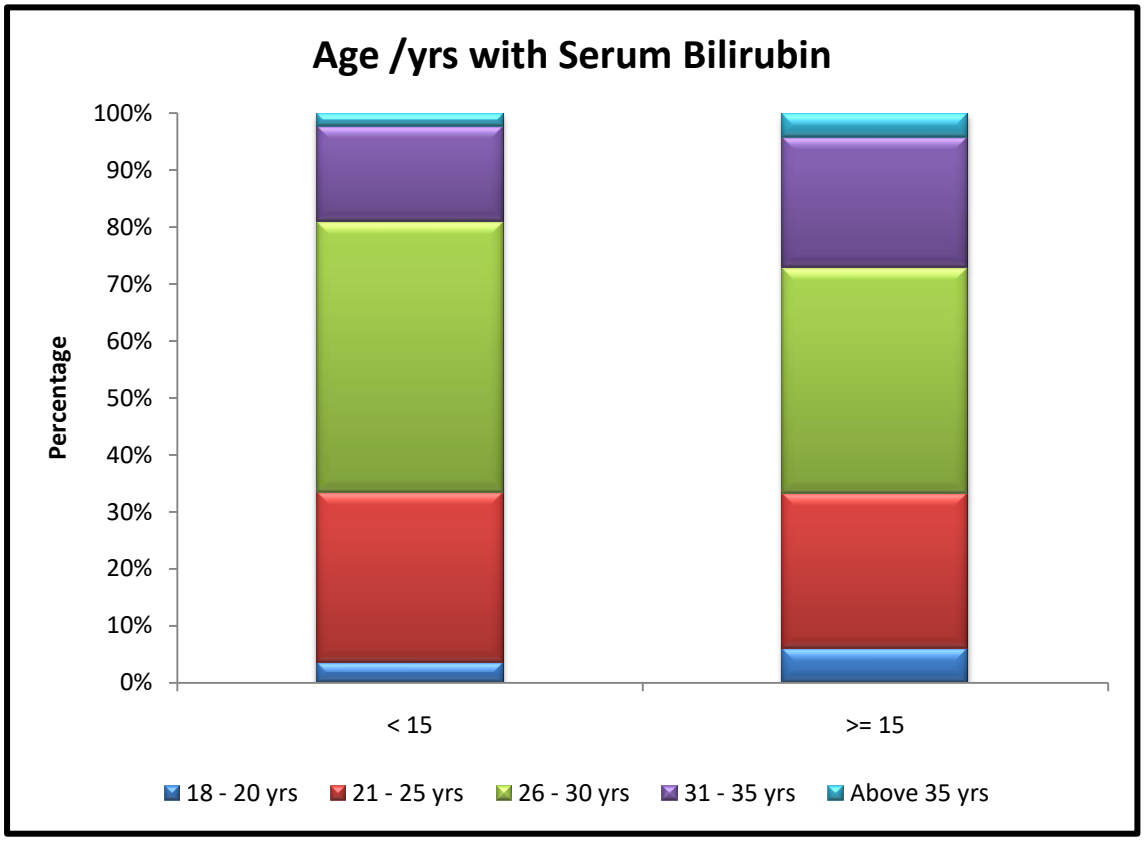


The above table shows Serum Bilirubin were 33.6% are <15, 66.4% are >=15 in our study

.Various factors which leads to raised serum bilirubin levels are described below.

Comparison of Age/Years with Serum Bilirubin by Pearson's Chi-square test

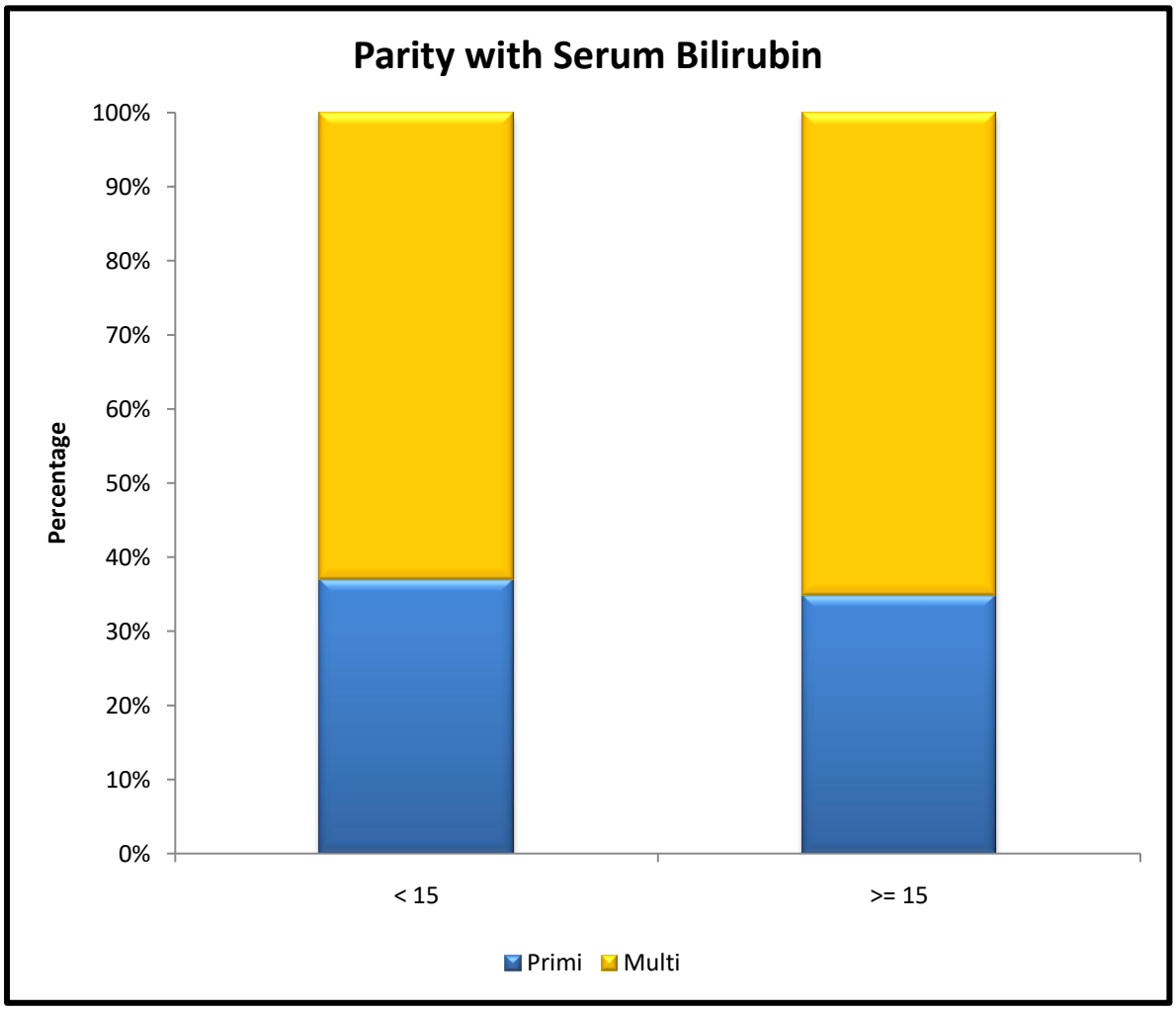
			Serum Bilirubin		Total	χ 2 - value	p-value
			< 15	>= 15			
Age /yrs	18 - 20 yrs	Count	3	10	13	3.159	0.531 #
		%	3.6%	6.0%	5.2%		
	21 - 25 yrs	Count	25	45	70		
		%	29.8%	27.1%	28.0%		
	26 - 30 yrs	Count	40	66	106		
		%	47.6%	39.8%	42.4%		
	31 - 35 yrs	Count	14	38	52		
		%	16.7%	22.9%	20.8%		
	Above 35 yrs	Count	2	7	9		
		%	2.4%	4.2%	3.6%		
Total		Count	84	166	250		
		%	100.0%	100.0%	100.0%		
# No Statistical Significance at p > 0.05 level							



The above table shows comparison between Age /years with Serum Bilirubin by Pearson's Chi-square test were χ^2=3.159, p=0.531>0.05 which shows no statistical significant association between Age /years and Serum Bilirubin.

COMPARISON OF PARITY WITH SERUM BILIRUBIN

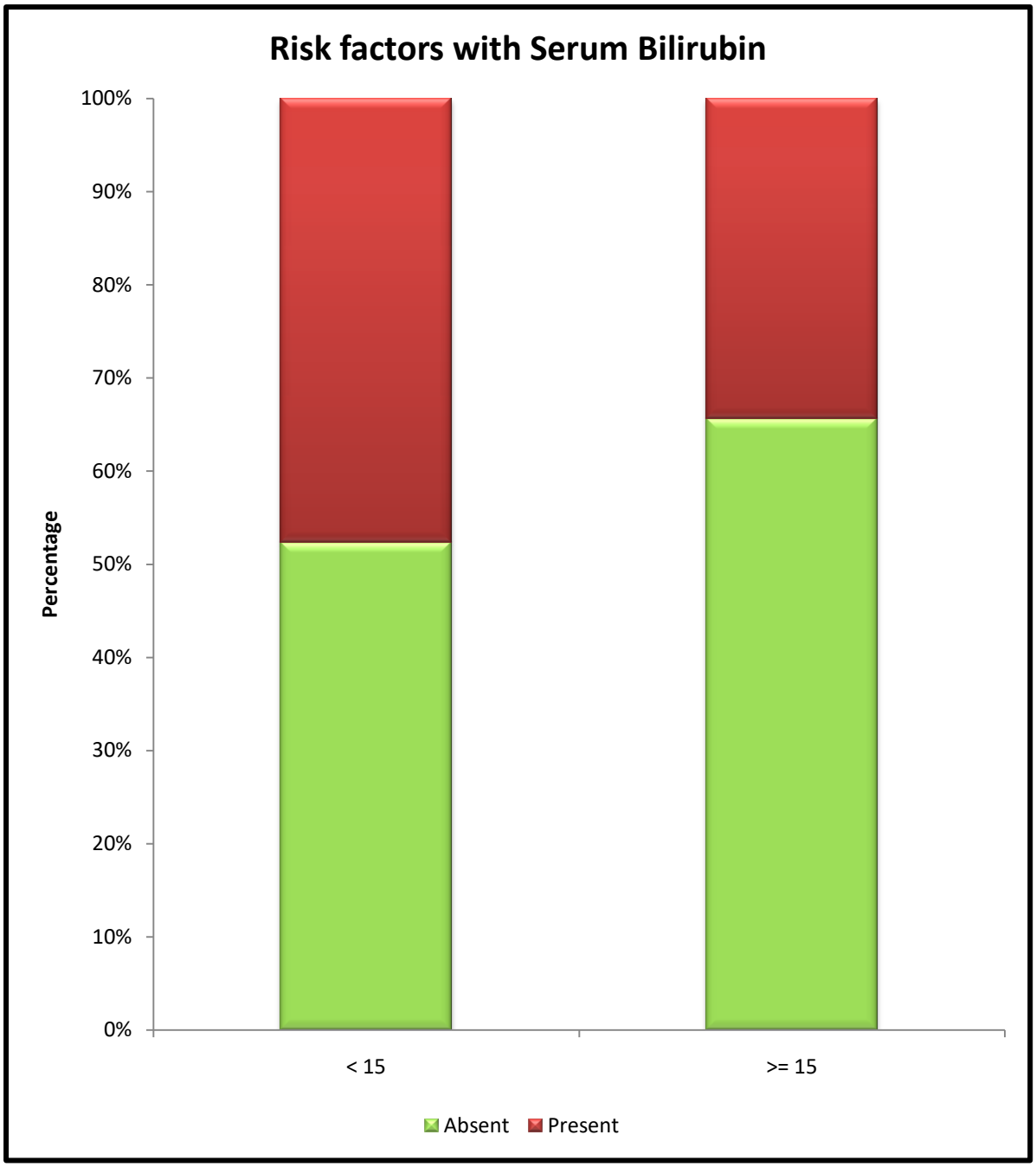
			Serum Bilirubin		Total	χ^2 - value	p-value
			< 15	>= 15			
Parity	Primi	Count	31	58	89	0.094	0.759 #
		%	36.9%	34.9%	35.6%		
	Multi	Count	53	108	161		
		%	63.1%	65.1%	64.4%		
Total		Count	84	166	250		
		%	100.0%	100.0%	100.0%		
# No Statistical Significance at p > 0.05 level							



The above table shows comparison between Parity with Serum Bilirubin by Pearson's Chi-square test were χ^2=0.094, p=0.759>0.05 which shows no statistical significant association between Parity and Serum Bilirubin.

Comparison of Risk factors with Serum Bilirubin by Pearson's Chi-square test

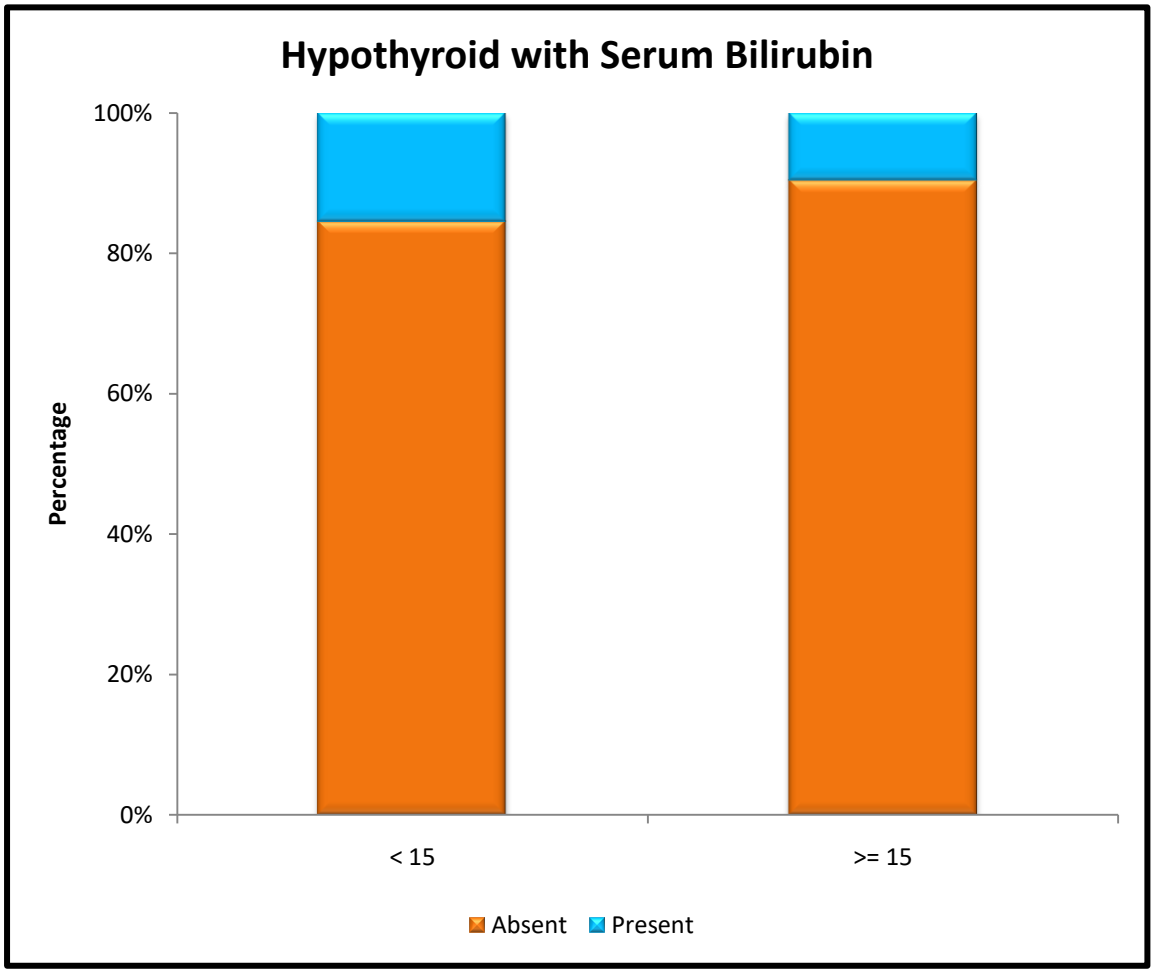
			Serum Bilirubin		Total	$\chi 2$ - value	p-value
			< 15	>= 15			
Risk factors	Absent	Count	44	109	153	4.144	0.042 *
		%	52.4%	65.7%	61.2%		
	Present	Count	40	57	97		
		%	47.6%	34.3%	38.8%		
Total		Count	84	166	250		
		%	100.0%	100.0%	100.0%		
* Statistical Significance at p < 0.05 level							



The above table shows comparison between Risk factors with Serum Bilirubin by Pearson's Chi-square test were χ^2=4.144, p=0.042<0.05 which shows statistical significant association between Risk factors and Serum Bilirubin.

Comparison of Hypothyroid with Serum Bilirubin by Pearson's Chi-square test

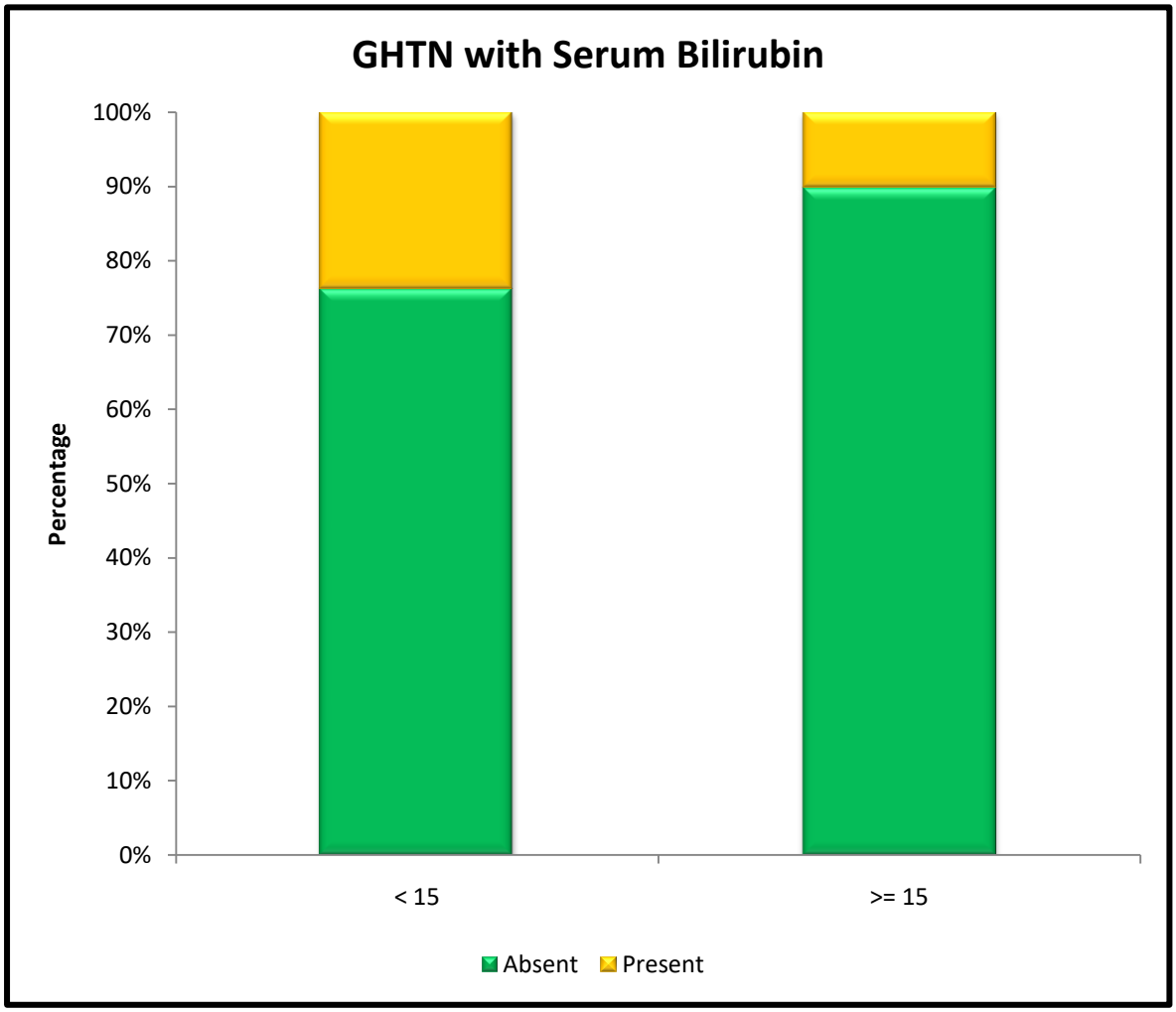
			Serum Bilirubin		Total	χ 2 - value	p-value
			< 15	>= 15			
Hypothyroid	Absent	Count	71	150	221	1.854	0.173 #
		%	84.5%	90.4%	88.4%		
	Present	Count	13	16	29		
		%	15.5%	9.6%	11.6%		
Total		Count	84	166	250		
		%	100.0%	100.0%	100.0%		
# No Statistical Significance at p > 0.05 level							



The above table shows comparison between Hypothyroid with Serum Bilirubin by Pearson's Chi-square test were χ^2=1.854, p=0.173>0.05 which shows no statistical significant association between Hypothyroid and Serum Bilirubin.

Comparison of GHTN with Serum Bilirubin by Pearson's Chi-square test

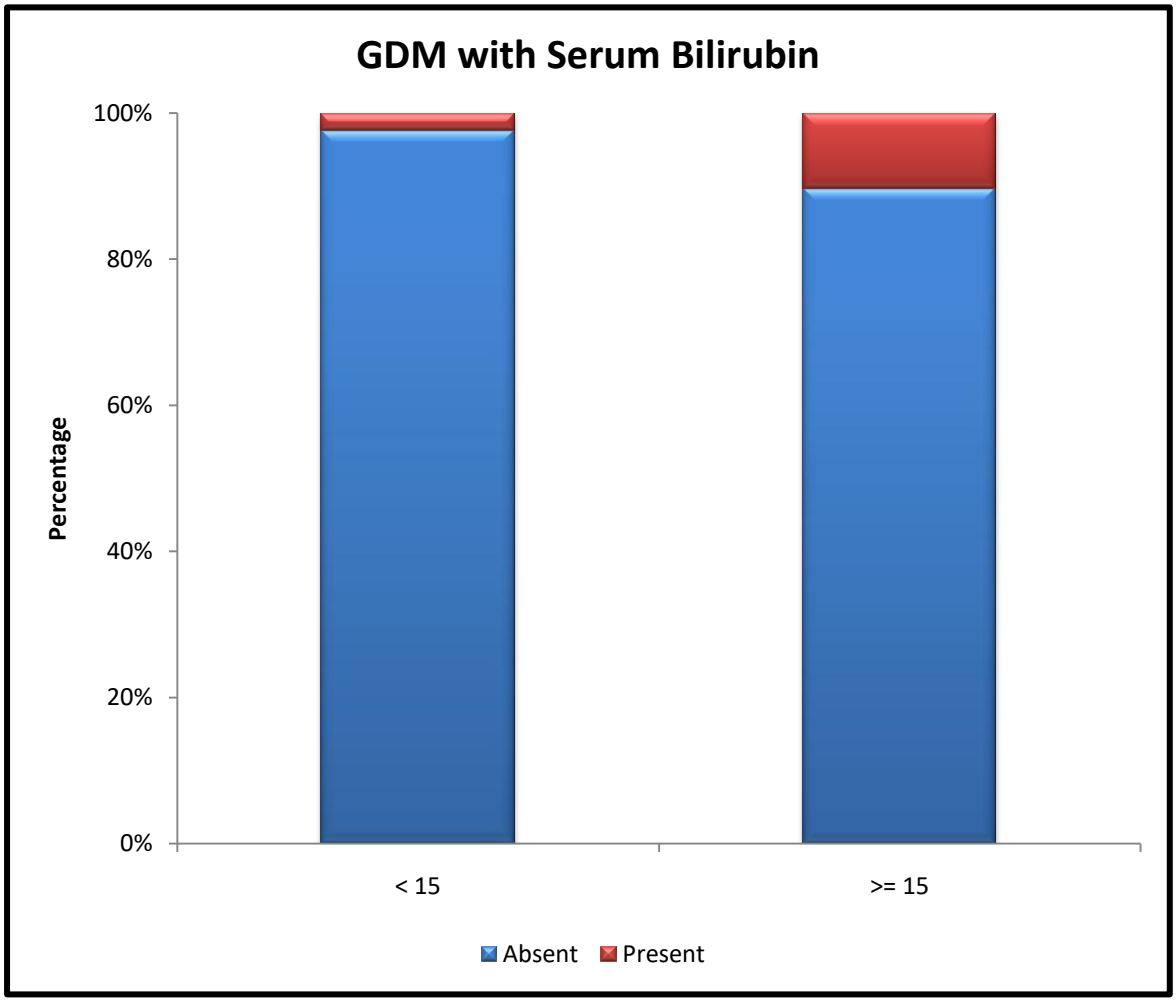
			Serum Bilirubin		Total	χ 2 - value	p-value
			< 15	>= 15			
GHTN	Absent	Count	64	149	213	8.144	0.0005 **
		%	76.2%	89.8%	85.2%		
	Present	Count	20	17	37		
		%	23.8%	10.2%	14.8%		
Total		Count	84	166	250		
		%	100.0%	100.0%	100.0%		
** Highly Statistical Significance at p < 0.01 level							



The above table shows comparison between GHTN with Serum Bilirubin by Pearson's Chi-square test were χ^2=8.144, p=0.0005<0.01 which shows highly statistical significant association between GHTN and Serum Bilirubin.

Comparison of GDM with Serum Bilirubin by Pearson's Chi-square test.

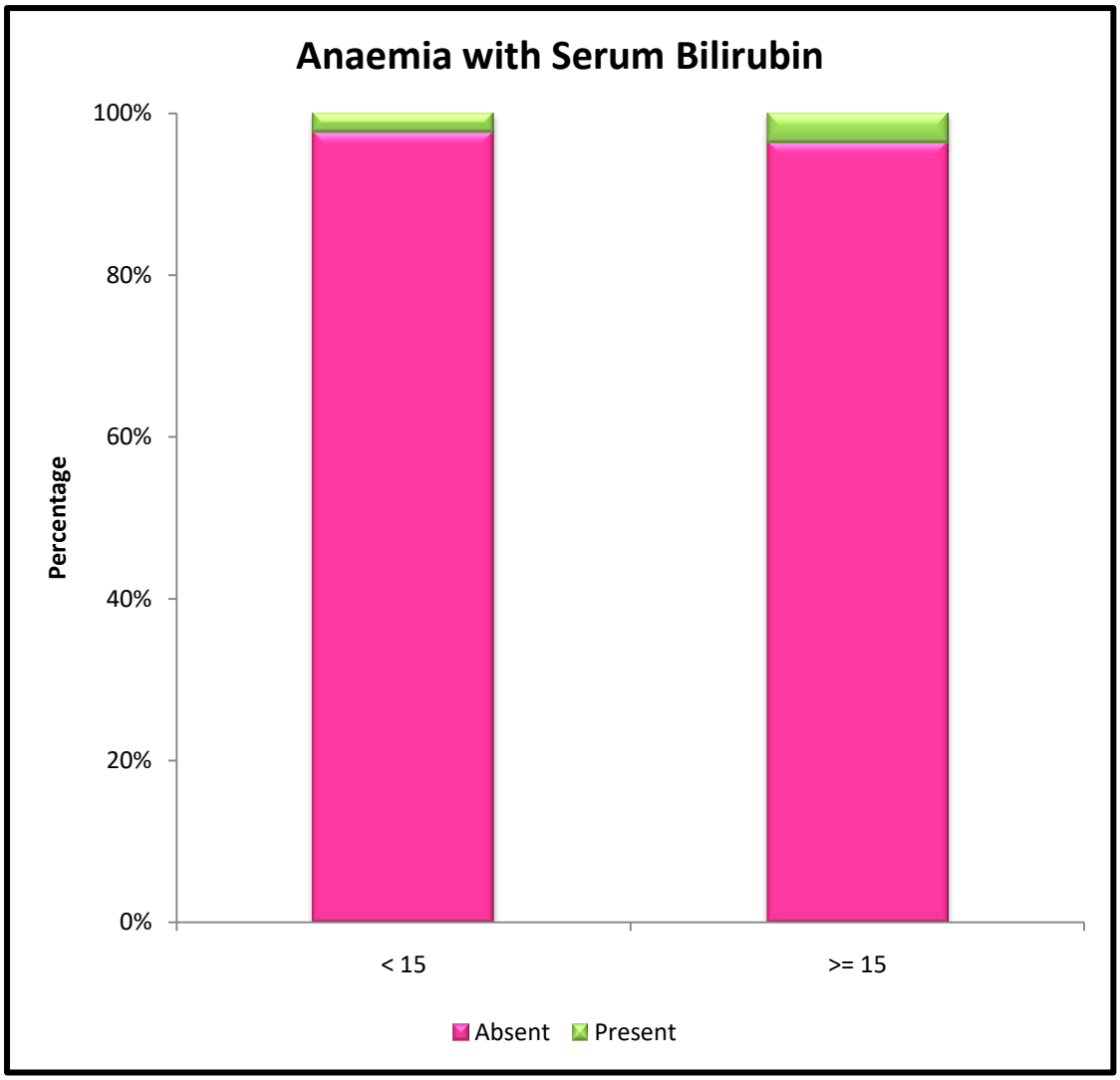
			Serum Bilirubin		Total	χ 2 - value	p-value
			< 15	>= 15			
GDM	Absent	Count	82	149	231	4.907	0.040 *
		%	97.6%	89.8%	92.4%		
	Present	Count	2	17	19		
		%	2.4%	10.2%	7.6%		
Total		Count	84	166	250		
		%	100.0%	100.0%	100.0%		
* Statistical Significance at p < 0.05 level							



The above table shows comparison between GDM with Serum Bilirubin by Pearson's Chi-square test were χ^2=4.907, p=0.040<0.05 which shows statistical significant association between GDM and Serum Bilirubin.

Comparison of Anaemia with Serum Bilirubin by Pearson's Chi-square test.

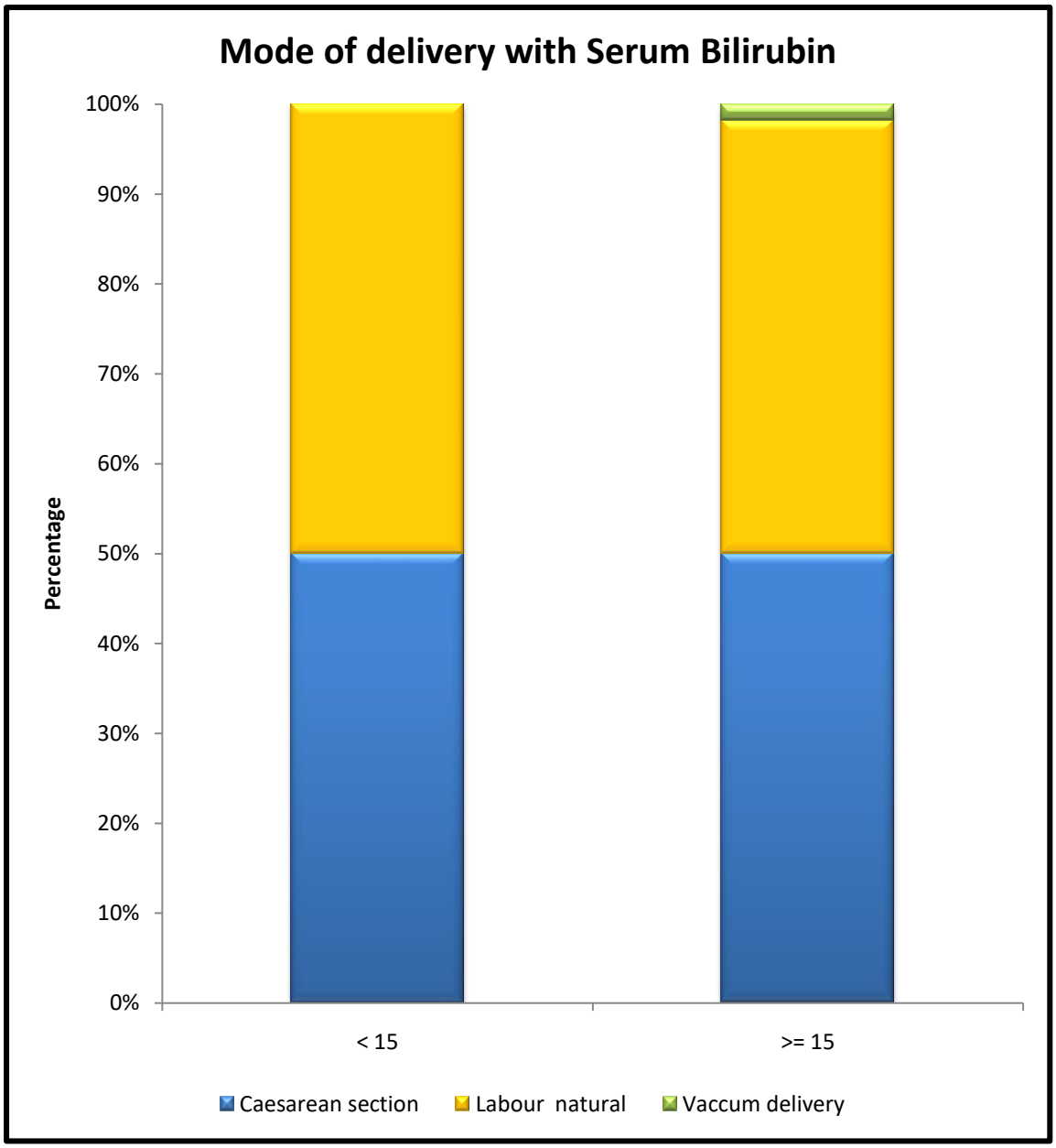
			Serum Bilirubin		Total	χ 2 - value	p-value
			< 15	>= 15			
Anaemia	Absent	Count	82	160	242	0.274	0.601 #
		%	97.6%	96.4%	96.8%		
	Present	Count	2	6	8		
		%	2.4%	3.6%	3.2%		
Total		Count	84	166	250		
		%	100.0%	100.0%	100.0%		
# No Statistical Significance at p > 0.05 level							



The above table shows comparison between Anaemia with Serum Bilirubin by Pearson's Chi-square test were χ^2=0.274, p=0.601>0.05 which shows no statistical significant association between Anaemia and Serum Bilirubin.

Comparison of Mode of delivery with Serum Bilirubin by Pearson's Chi-square test

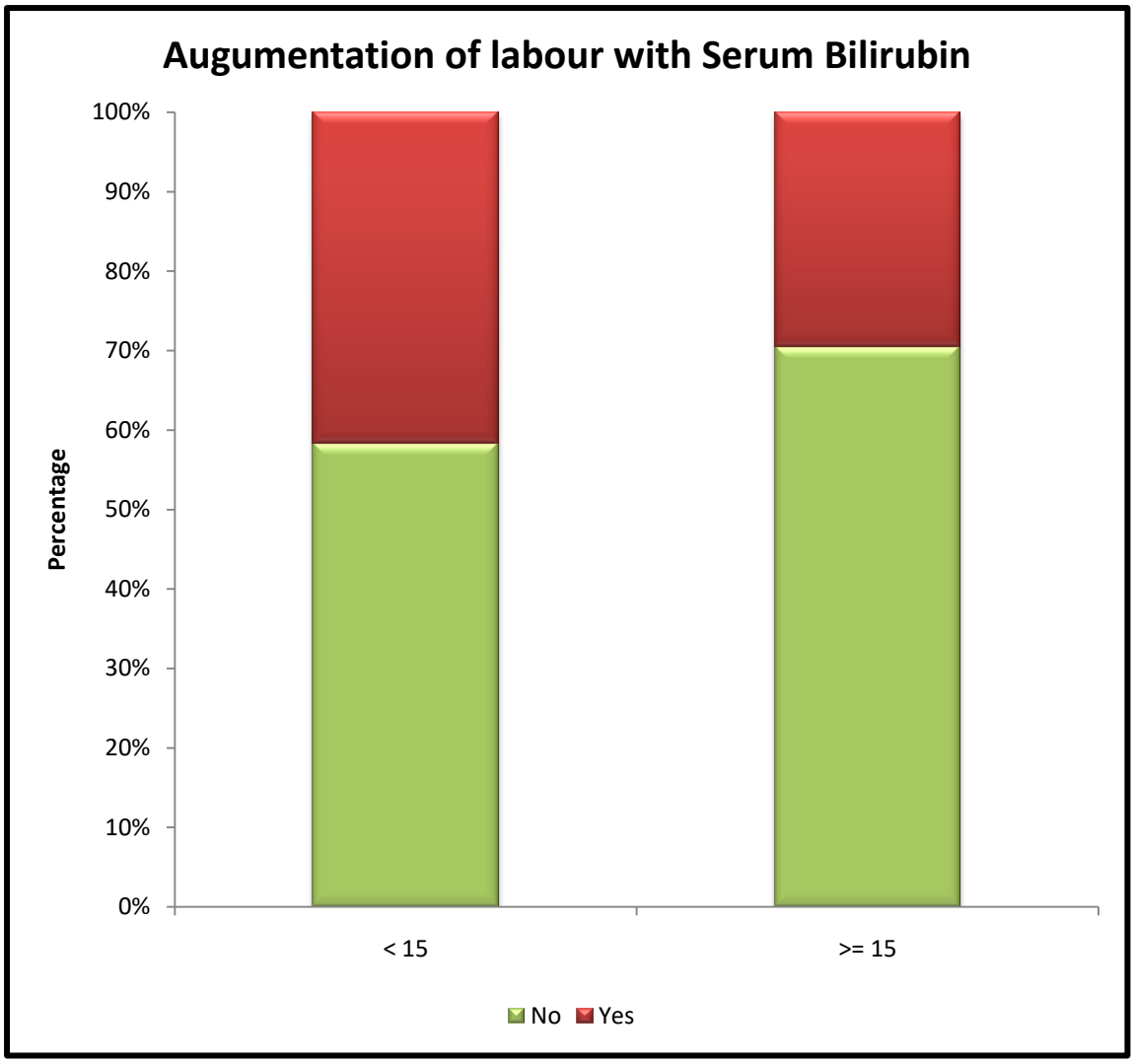
			Serum Bilirubin		Total	χ 2 - value	p-value
			< 15	>= 15			
Mode of delivery	Caesarean section	Count	42	83	125	1.555	0.670 #
		%	50.0%	50.0%	50.0%		
	Labour natural	Count	42	80	122		
		%	50.0%	48.2%	48.8%		
	Vaccum delivery	Count	0	3	3		
		%	0.0%	1.8%	1.2%		
Total		Count	84	166	250		
		%	100.0%	100.0%	100.0%		
# No Statistical Significance at p > 0.05 level							



The above table shows comparison between Mode of delivery with Serum Bilirubin by Pearson's Chi-square test were χ^2=1.555, p=0.670>0.05 which shows no statistical significant association between Mode of delivery and Serum Bilirubin.

Comparison of Augumentation of labour with Serum Bilirubin by Pearson's Chi-square test

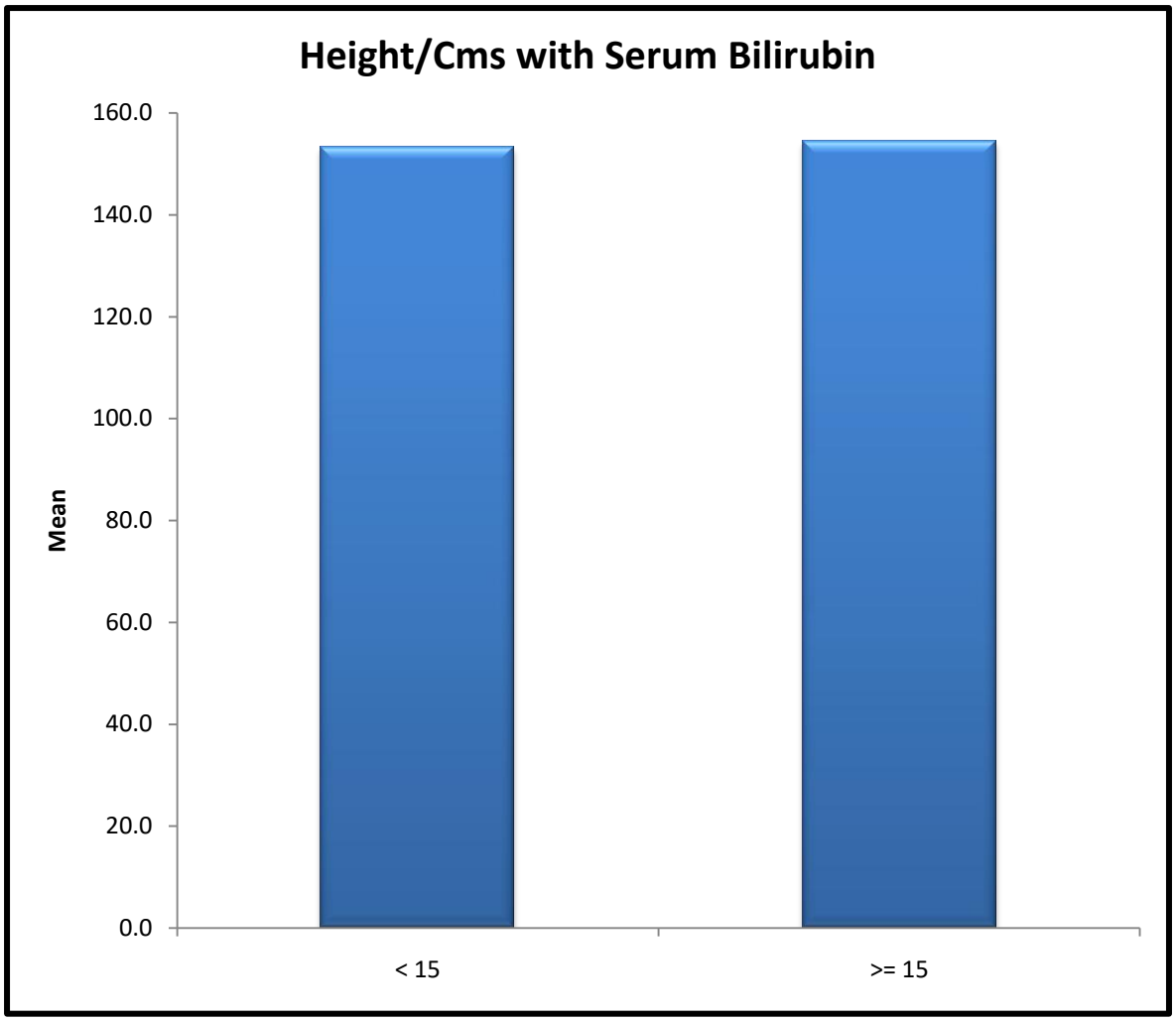
			Serum Bilirubin		Total	$\chi 2$ - value	p-value
			< 15	>= 15			
Augumentation of labour	No	Count	49	117	166	3.690	0.055 #
		%	58.3%	70.5%	66.4%		
	Yes	Count	35	49	84		
		%	41.7%	29.5%	33.6%		
Total		Count	84	166	250		
		%	100.0%	100.0%	100.0%		
# No Statistical Significance at p > 0.05 level							



The above table shows comparison between Augumentation of labour with Serum Bilirubin by Pearson's Chi-square test were χ^2=3.690, p=0.055>0.05 which shows no statistical significant association between Augumentation of labour and Serum Bilirubin.

Comparison of Height/Cms with Serum Bilirubin by Unpaired t-test

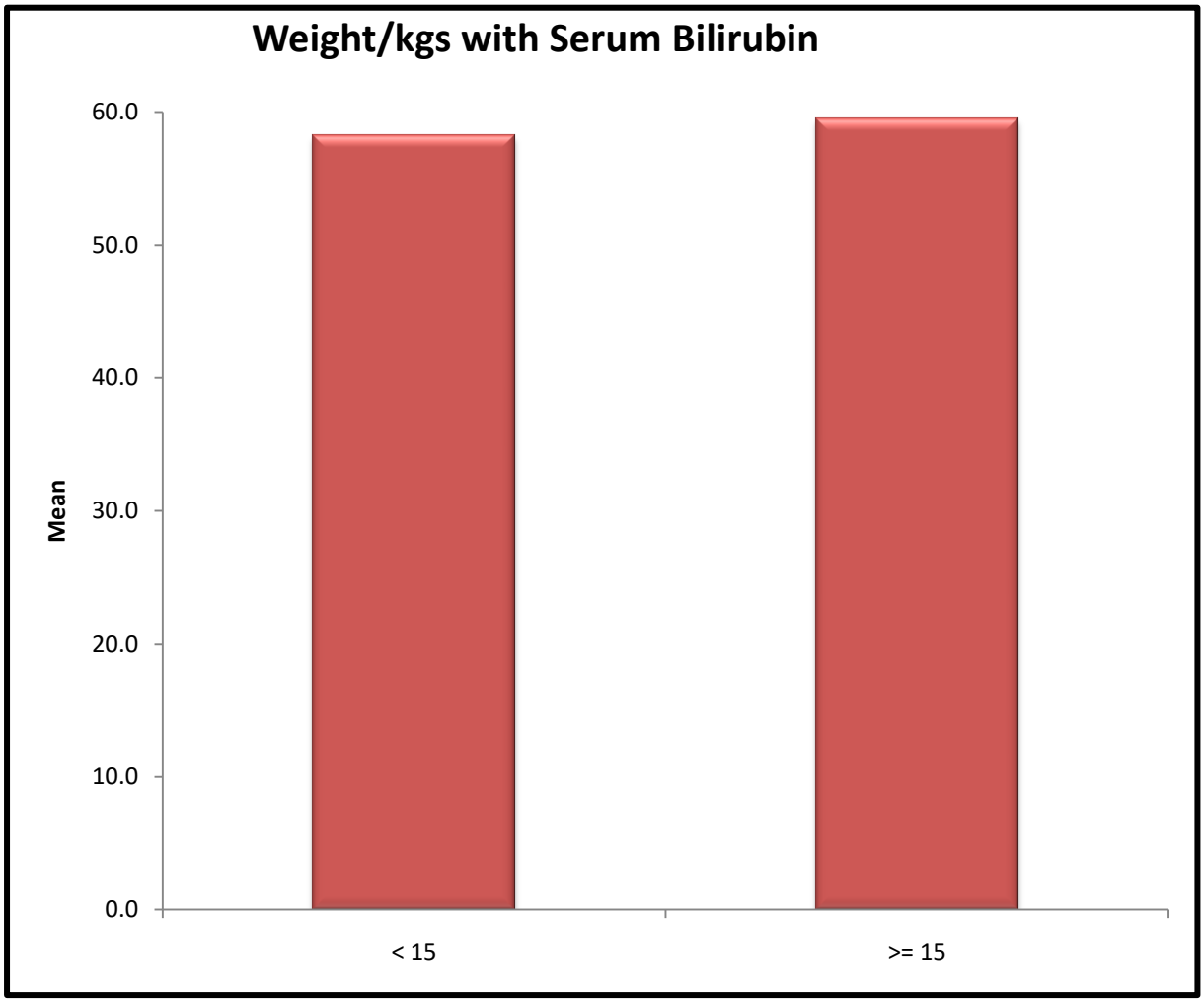
Variable	Serum Bilirubin	N	Mean	SD	t-value	p-value
Height/Cms	< 15	84	153.3	5.3	1.446	0.149 #
	>= 15	166	154.4	6.1		
# No Statistical Significance at p > 0.05 level						



The above table shows comparison of Height/Cms with Serum Bilirubin by Unpaired t-test were t-value=1.446, p-value=0.149>0.05 which shows no statistical significant difference at p >0.05 level.

Comparison of Weight/kgs with Serum Bilirubin by Unpaired t-test

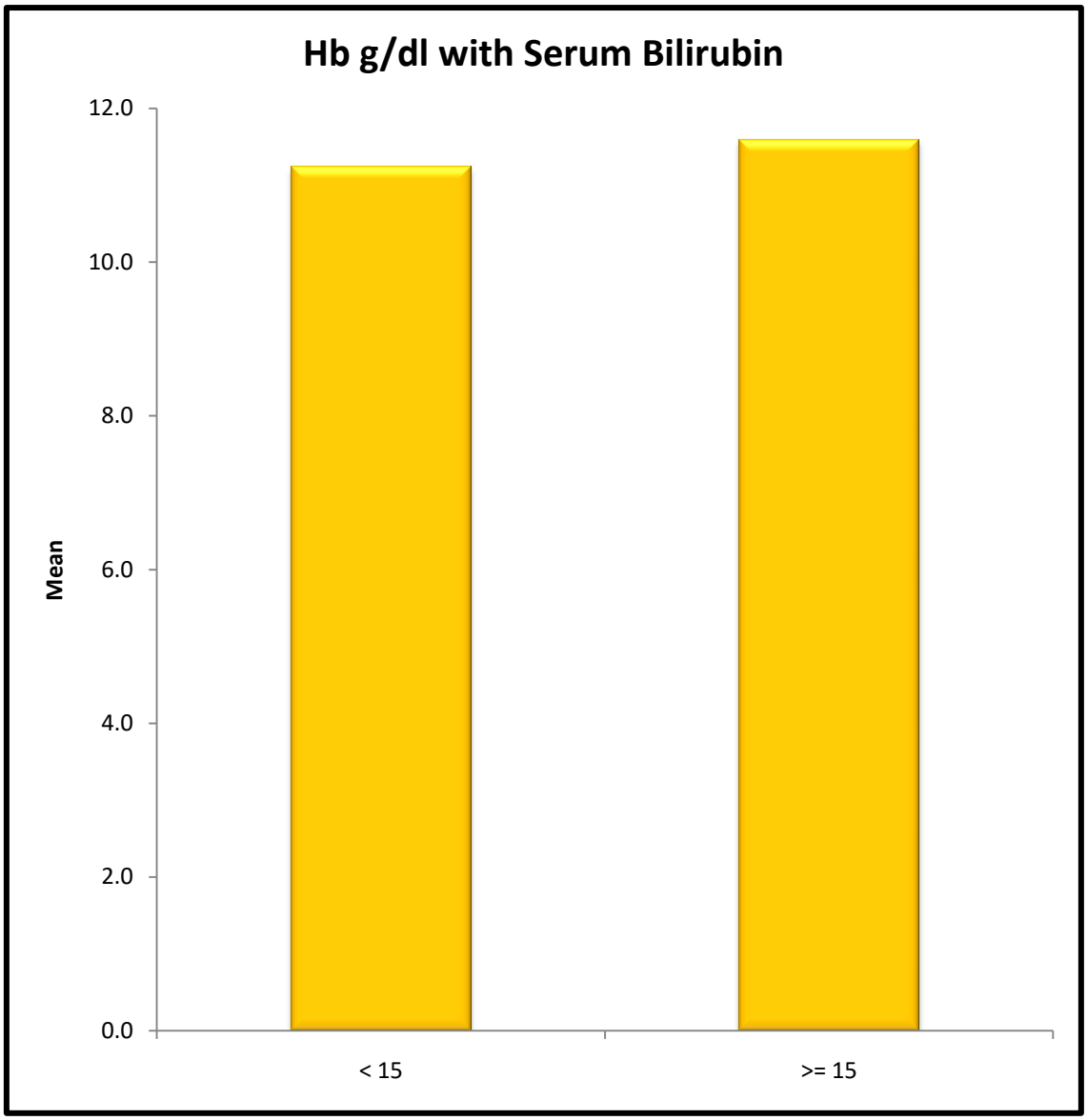
Variable	Serum Bilirubin	N	Mean	SD	t-value	p-value
Weight/kgs	< 15	84	58.2	8.6	1.165	0.245 #
	>= 15	166	59.5	7.8		
# No Statistical Significance at p > 0.05 level						



The above table shows comparison of Weight/kgs with Serum Bilirubin by Unpaired t-test were t-value=1.165, p-value=0.245>0.05 which shows no statistical significance.

Comparison of Hb g/dl with Serum Bilirubin by Unpaired t-test

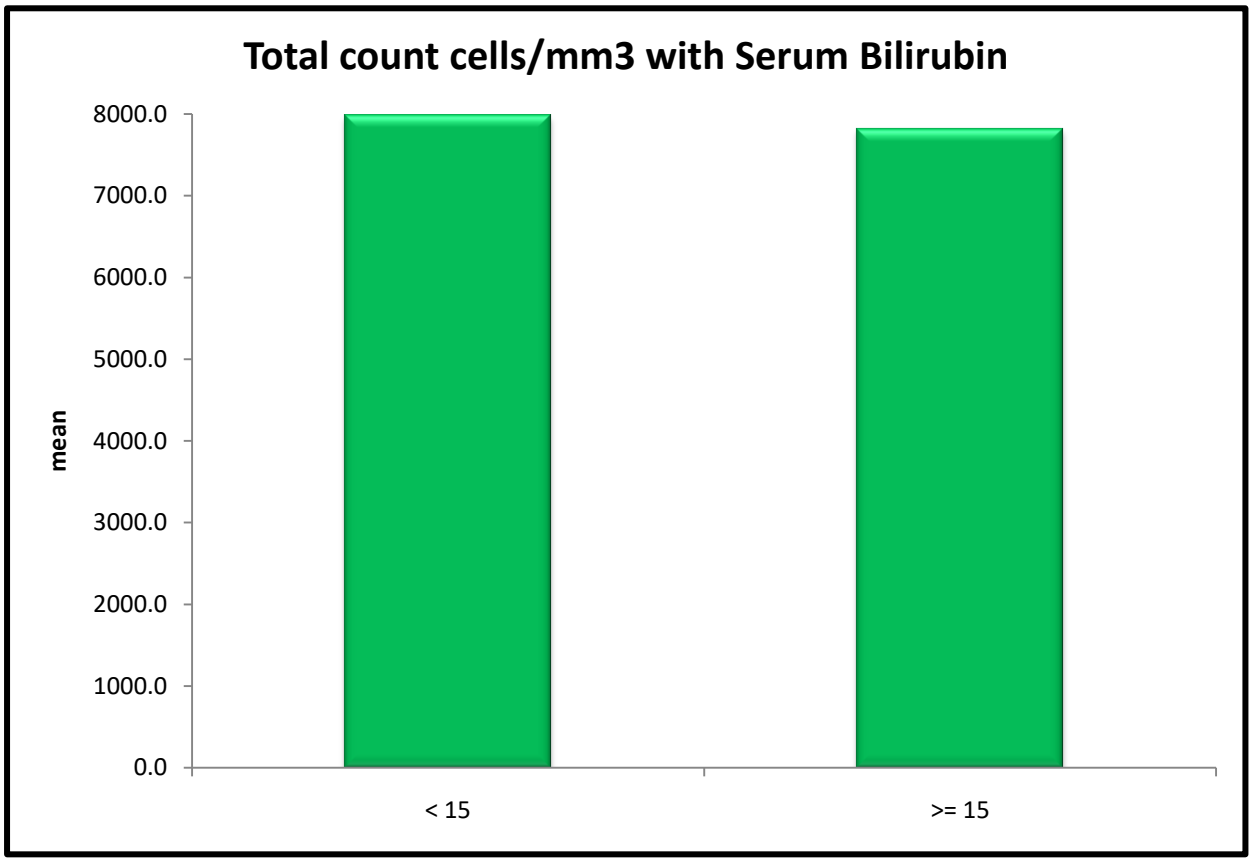
Variable	Serum Bilirubin	N	Mean	SD	t-value	p-value
Hb g/dl	< 15	84	11.2	1.2	2.096	0.037 *
	>= 15	166	11.6	1.3		
* Statistical Significance at p < 0.05 level						



The above table shows comparison of Hb g/dl with Serum Bilirubin by Unpaired t-test were t-value=2.096, p-value=0.037<0.05 which shows statistical significant difference at p <0.05 level.

Comparison of Total count cells/mm3 with Serum Bilirubin by Unpaired t-test

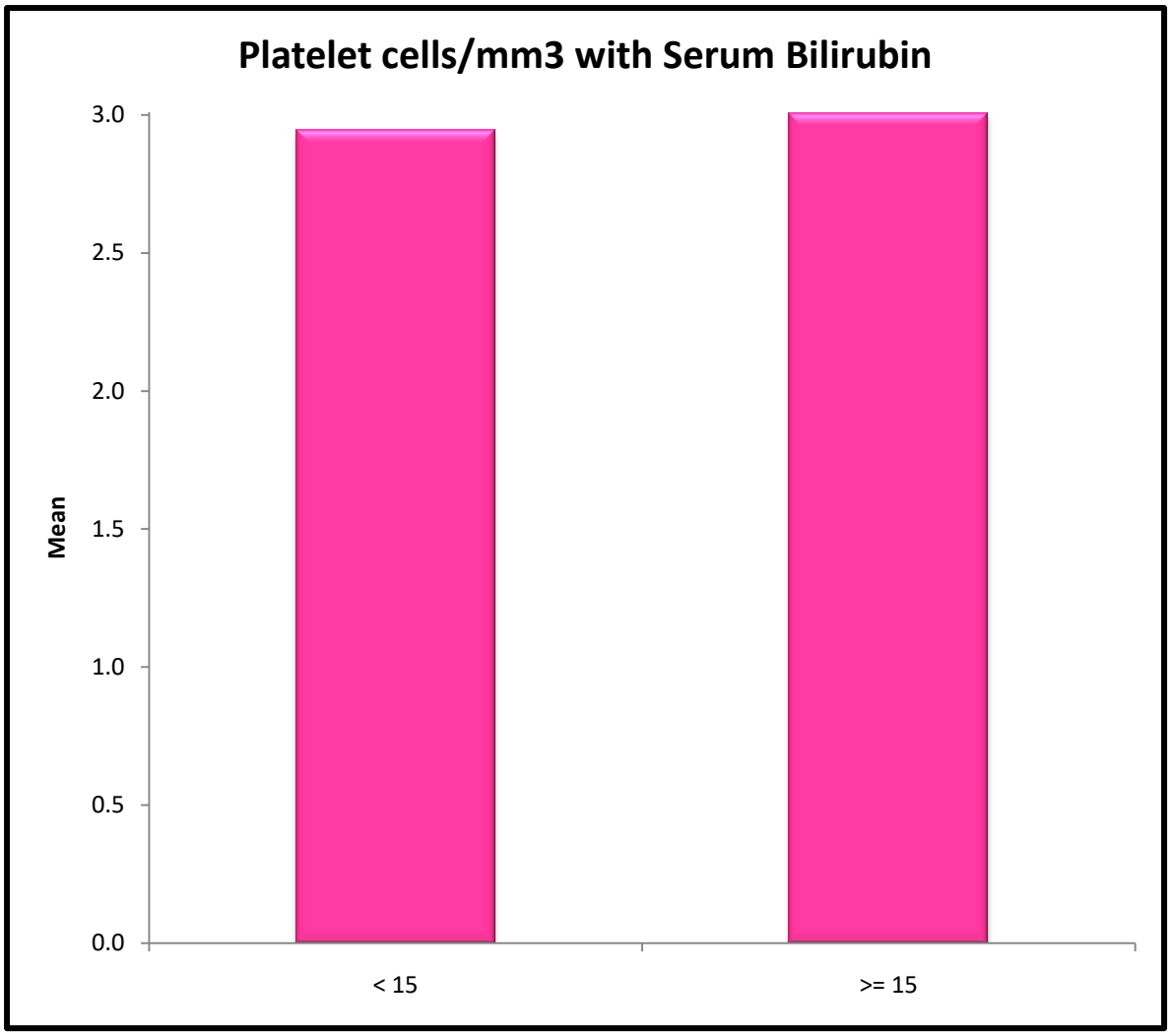
Variable	Serum Bilirubin	N	Mean	SD	t-value	p-value
Total count cells/mm3	< 15	84	7985.7	1805.2	0.681	0.496 #
	>= 15	166	7819.9	1824.5		
# No Statistical Significance at p > 0.05 level						



The above table shows comparison of Total count cells/mm3 with Serum Bilirubin by Unpaired t-test were t-value=0.681, p-value=0.496>0.05 which shows no statistical significant difference at p >0.05 level**.**

Comparison of Platelet cells/mm3 with Serum Bilirubin by Unpaired t-test

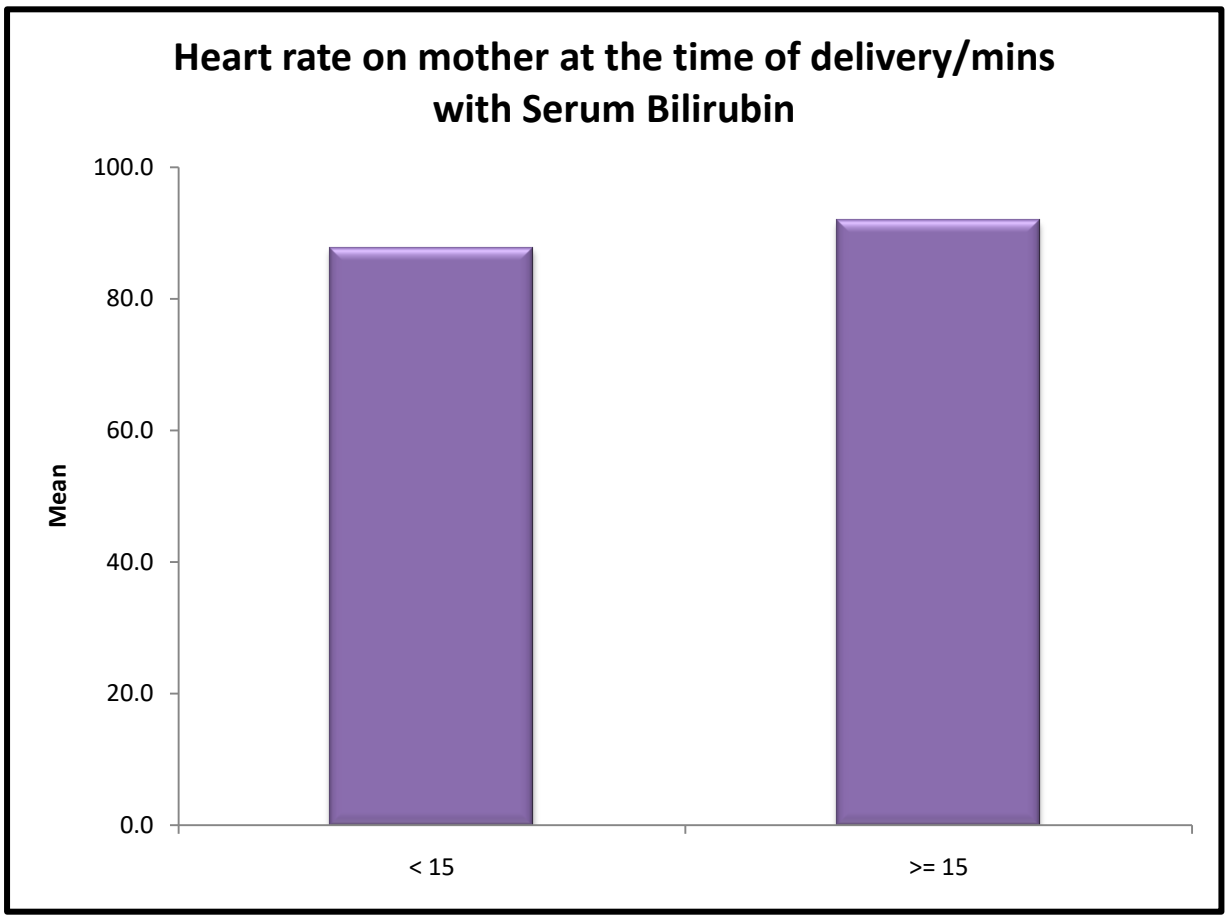
Variable	Serum Bilirubin	N	Mean	SD	t-value	p-value
Platelet cells/mm3	< 15	84	2.9	0.6	0.690	0.491 #
	>= 15	166	3.0	0.7		
# No Statistical Significance at p > 0.05 level						



The above table shows comparison of Platelet cells/mm3 with Serum Bilirubin by Unpaired t-test were t-value=0.690, p-value=0.491>0.05 which shows no statistical significant difference at p >0.05 level.

Comparison of Heart rate on mother at the time of delivery/mins with Serum Bilirubin by Unpaired t-test.

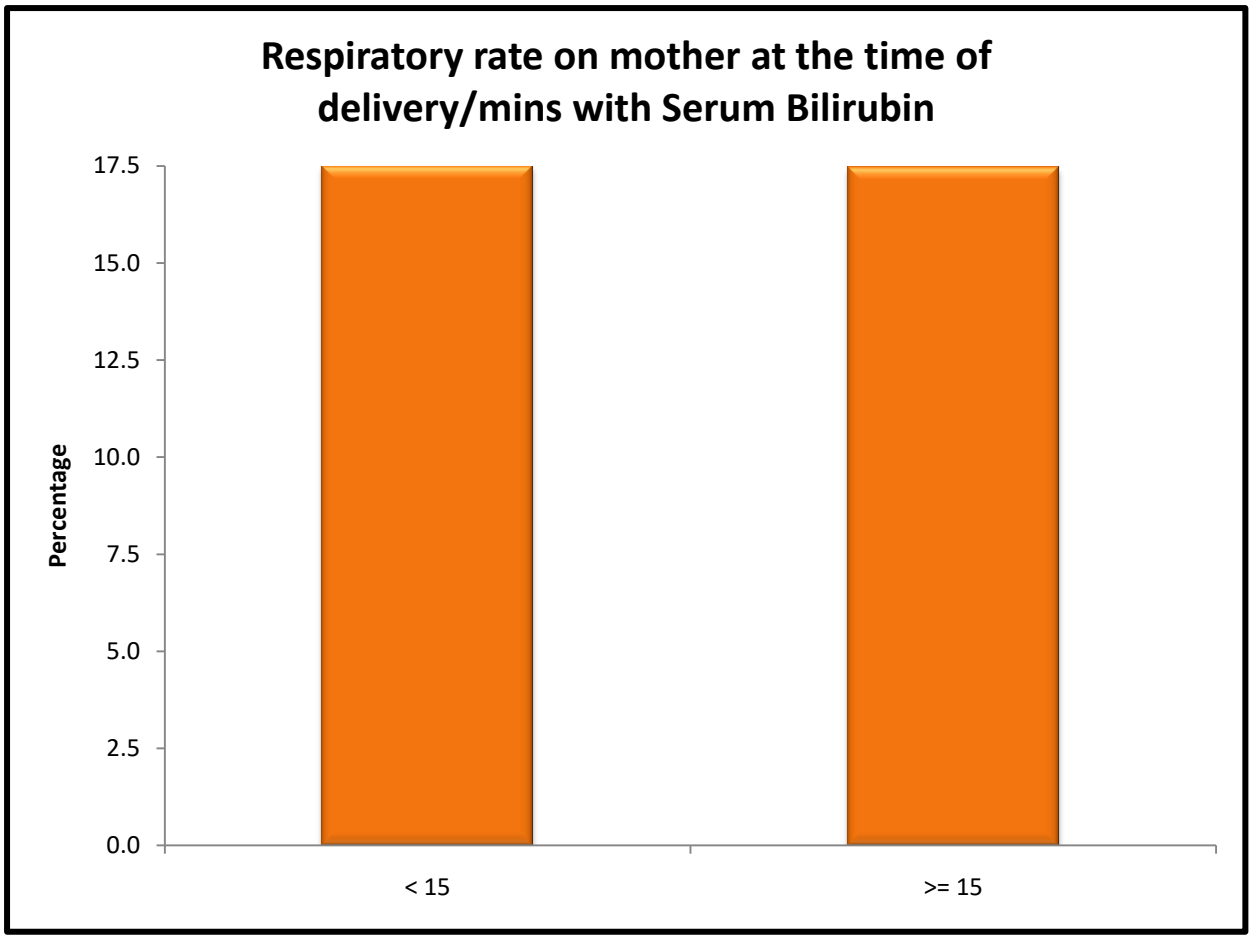
Variable	Serum Bilirubin	N	Mean	SD	t-value	p-value
Heart rate on mother at the time of delivery/mins	< 15	84	87.7	9.8	0.604	0.547 #
	>= 15	166	91.9	63.2		
# No Statistical Significance at p > 0.05 level						



The above table shows comparison of Heart rate on mother at the time of delivery/mins with Serum Bilirubin by Unpaired t-test were t-value=0.604, p-value=0.547>0.05 which shows no statistical significant difference at p >0.05 level.

Comparison of Respiratory rate on mother at the time of delivery/mins with Serum Bilirubin by Unpaired t-test

Variable	Serum Bilirubin	N	Mean	SD	t-value	p-value
Respiratory rate on mother at the time of delivery/mins	< 15	84	17.5	1.5	0.200	0.842 #
	>= 15	166	17.5	1.5		
# No Statistical Significance at p > 0.05 level						



The above table shows comparison of Respiratory rate on mother at the time of delivery/mins with Serum Bilirubin by Unpaired t-test were t-value=0.200, p-value=0.842>0.05 which shows no statistical significant difference at p >0.05 level.

DISCUSSION

250 post partum mothers were included in this study and following results observed.

AGE DISTRIBUTION

- **In our study** the Age distribution were 18-20 years is 5.2%, 21-25 years is 28.0%, 26-30 years is 42.4%, 31-35 years is 20.8%, >35 years is 3.6%.
- The Serum Bilirubin were 33.6% are <15, 66.4% are >=15.
- The Age /years with Serum Bilirubin by Pearson's Chi-square test were χ^2=3.159, p=0.531>0.05 which shows no statistical significant association between Age /years and Serum Bilirubin.
- Our study is supported by Garosi E et al , Najib KS et al. Maternal age was non determinants of neonatal jaundice in this study**.**

PARITY

In our study The Parity with Serum Bilirubin by Pearson's Chi-square test were χ^2=0.094, p=0.759>0.05 which shows no statistical significant association between Parity and Serum Bilirubin.

- Parity > 4 is one of the risk factors of neonatal jaundice.
- In our study 7 grand multiparas are present and all their neonates is found to develop neonatal jaundice. This is due to grand multiparas are found to have increased risk of pregnancy complications, fetal growth disorders, prematurity.
- This is due to network disruption in chorionic villous of placenta affecting transportation of oxygen and nutrients from mother to fetus. This study is also supported by Winkjosastro (2008) and Rochjati(2013).

- However, there is no relationship between parity and neonatal jaundice in our study. The absence of relationship possibility may be due to less number of samples or due to presence of other influential factors.

RISK FACTORS.

- The Risk factors with Serum Bilirubin by Pearson's Chi-square test were χ^2=4.144, p=0.042<0.05 which shows statistical significant association between Risk factors and Serum Bilirubin.

- Our study shows presence of risk factors increases the risk of neonatal jaundice . The following risk factors are being studied to find the risk factors that has strong association with development of neonatal jaundice.

HYPOTHYROID

- In our study the Hypothyroid in mother is compared with Serum Bilirubin by Pearson's Chi-square test were χ^2=1.854, p=0.173>0.05 which shows no statistical significant association between Hypothyroid and Serum Bilirubin.

- Our study was supported by study conducted in PGI Chandigarh in 2003.

GHTN

- In our study the association of GHTN with Serum Bilirubin by Pearson's Chi-square test were χ^2=8.144, p=0.0005<0.01 which shows highly statistical significant association between GHTN and Serum Bilirubin.
- Our findings in this study was supported by study published in Journal of medical science and clinical research in 2017. According to this study geatstional hypertension is one of the determinant of neonatal jaundice.

GESTATIONAL DIABETES MELLITUS

- In our study the association of GDM with Serum Bilirubin by Pearson's Chi-square test were χ^2=4.907, p=0.040<0.05 which shows statistical significant association between GDM and Serum Bilirubin.
- Our study is supported by the study conducted in Department of Paediatrics, Ernst Moritz Arndt University of Greifswald, G.D.R. According to this study newborns of insulin dependant mothers have prolonged hypebilirubinemia compared with the controls.
- This is due to presence of polycythaemia in infants of diabetic mothers which inturn leads to increased destruction of haemoglobin along with immaturity of liver enzymes leads to development of neonatal jaundice.
- Another mechanism proposed is induction of heme oxygenase in newborns of diabetic mothers.

ANAEMIA

- In our study the association of anaemia with serum bilirubin by Pearson's Chi-square test were χ^2=0.274, p=0.601>0.05 which shows no statistical significant association between Anaemia and Serum Bilirubin.

- Neonatal jaundice is a common manifestation in babies of haemolytic anaemia. However no association was found between anaemia and jaundice in our study propably due to less sample size and less prevalence of haemolytic jaundice in Chennai.
- In haemolytic anaemia jaundice is due to increased breakdown of RBCs resulting in accumulation of excess bilirubin in the blood.

MODE OF DELIVERY

- In our study the association between mode of delivery with Serum Bilirubin by Pearson's Chi-square test were χ^2=1.555, p=0.670>0.05 which shows no statistical significant association between mode of delivery and serum bilirubin.
- It has been reported in previous studies that neonatal jaundice is more common in caesarean deliveries however, recent studies prove that neonatal jaundice is more common in normal vaginal deliveries. This conflicting results is linked to types of variables, type of study, sample size and study condition which can affect data analysis.

AUGMENTATION OF LABOUR

- In our study the Augumentation of labour with Serum Bilirubin by Pearson's Chi-square test were χ^2=3.690, p=0.055>0.05 which shows no statistical significant association between Augumentation of labour and Serum Bilirubin.

- It was previously established that oxytocin is involved in bilirubin metabolism and described as a risk factor of neonatal jaundice. Augmentation of labour with oxytocin due to

its hyposmotic and lytic effects (increased red cell lysis) results in hyperbilirubinemia. However this factor should be assessed with increased sample size.

- Our study is supported by the cohort study conducted in Tehran which shows no association between neonatal jaundice and using oxytocin for augmentation of labour. According to this study using oxytocin for augmentation of labour does not produce jaundice when used in correct dose and duration.

HEIGHT

- In our study the Height/Cms with Serum Bilirubin by Unpaired t-test were t-value=1.446, p-value=0.149>0.05 which shows no statistical significant difference at p >0.05 level.

WEIGHT

- In our study the Weight/kgs with Serum Bilirubin by Unpaired t-test were t-value=1.165, p-value=0.245>0.05 which shows no statistical significant difference at p >0.05 level.

HAEMOGLOBIN OF MOTHER

- In our study the association of Hb g/dl with Serum Bilirubin by Unpaired t-test were t-value=2.096, p-value=0.037<0.05 which shows statistical significant difference at p <0.05 level.

WBC OF MOTHER

- In our study the association of Total count cells/mm3 with Serum Bilirubin by Unpaired t-test were t-value=0.681, p-value=0.496>0.05 which shows no statistical significant difference at p >0.05 level.

PLATELETS OF MOTHER

In our study the association of Platelet cells/mm3 with Serum Bilirubin by Unpaired t-test were t-value=0.690, p-value=0.491>0.05 which shows no statistical significant difference at p >0.05 level.

HEART RATE AND RESPIRATORY RATE OF MOTHER AT THE TIME OF DELIVERY

- In our study the association between the Heart rate on mother at the time of delivery/mins with Serum Bilirubin by Unpaired t-test were t-value=0.604, p-value=0.547>0.05 which shows no statistical significant difference at p >0.05 level.
- In our study the association between the Respiratory rate on mother at the time of delivery/mins with Serum Bilirubin by Unpaired t-test were t-value=0.200, p-value=0.842>0.05 which shows no statistical significant difference at p >0.05 level.

SUMMARY

In our study 250 postpartum women whose babies require intervention phototherapy for neonatal jaundice were studied. It was observed that

- The Age distribution were 18-20 years is 5.2%, 21-25 years is 28.0%, 26-30 years is 42.4%, 31-35 years is 20.8%, >35 years is 3.6%. In this study no association between maternal age and neonatal jaundice.
- There was no significant association found between parity and development of neonatal jaundice in this study(p=0.759)
- About 38.8% of babies of postpartum mothers with risk factors developed neonatal jaundice . In this study it shows significant association between maternal risk factors and development of neonatal jaundice (p=0.042).
- Various maternal risk factors such as gestational hypertension, gestational diabetes mellitus, hypothyroid, anaemia were studied for its association with neonatal jaundice.
- About 11.6% of babies born to mothers with hypothyroid developed neonatal jaundice. In this study it was found there is no association between hypothyroid and development of neonatal jaundice (p=0.173)
- In this study about 14.8% of babies born to mothers with GHTN developed neonatal jaundice. Among them 23.8% of neonates have serum bilirubin less than 15 and 10.2% of neonates have serum bilirubin more than 15. In this study it was found there was significant association between GHTN and development of neonatal jaundice(p=0.005, highly significant).
- In our study newborns of mothers with gestational diabetes mellitus have higher propability of development of neonatal jaundice . The statistical

association between gestational diabetes mellitus and development of neonatal jaundice was found to be p=0.04.

- In our study there was no association between anaemia and development of neonatal jaundice.

- Mode of delivery, Augmentation of labour with oxytocin was not associated with development of neonatal jaundice.

- In our study Comparisons of maternal physical parameters like height and weight was found that there is no association with development of neonatal jaundice.

- In our study maternal blood indices like hb, total count and platelets in postpartum period have no association with development of neonatal jaundice.

- Heart rate of the mother and respiratory rate of the mother at the time of delivery have no association with development of neonatal jaundice was found in our study.

CONCLUSION

Our study aims to identify maternal risk factors that have association with the development of neonatal jaundice. Preventing the risk correlated with maternal factors or identifying neonates with these risk factors is firstly important in effective management of infants, which can be taken into account by improving maternal and public health education. The findings of this study suggested that maternal risk factors such as gestational hypertension and gestational diabetes mellitus was found to be strongly associated with development of neonatal jaundice.

Neonatal jaundice is the most common cause of admission in the hospital. Diagnosis and timely treatment of neonatal jaundice helps in preventing its dangerous effects. Knowing the predisposing factors of neonatal jaundice helps in preventing these factors and the primary problem.

PROFORMA

Serial no : Date of admission:

Name: Age:

Husbands name:

Address:

Occupation:

Socioeconomic status:

Booking:

Immunisation:

HISTORY OF PRESENT ILLNESS

Menstrual history: Regular/Irregular

LMP:

EDD:

Marital history: Married since:

Consangunity

H/o Infertility:

Obstetric history: G P L A

Last child birth

Previous Obstetric History: Details of outcome

Personal History: Smoking

Alcohol

Diet

Past medical History:

Gestational hypertension/chronic hypertension:

GDM/ Overt DM:

Heart disease:

Drug intake:

Anaemia treatment:

Past Surgical History:

Present pregnancy:

First trimester:

Hyperemesis

Fever

Radiation exposure

Medications:

Pain abdomen:

Second Trimester:

Date of Quickening

H/O Bleeding PV

GDM

Pre eclampsia

Third trimester

H/O Bleeding PV,draining PV

GDM

Pre eclampsia

GENERAL EXAMINATION

Height at booking:

Weight at booking:

BMI at booking:

Weight at delivery:

Anaemia:

Edema:

Pulse:

Respiration:

Blood pressure:

Cardiovascular system:

Respiratory system:

Thyroid:

Breast:

Spine:

Gait:

OBSTETRIC EXAMINATION

Per abdomen

Fundal height

Abdominal girth:

Fundal grip:

Umbilical grip:

First pelvic grip:

Second pelvic grip:

Fetal heart:

Liquor volume:

Estimated fetal weight:

PELVIC EXAMINATION

INVESTIGATIONS

Urine: albumin

Sugar

Blood:

Haemoglobin:

Total count:

Platelets:

PCV:

Blood sugar:

Urea:

Others:

ANTEPARTUM COMPLICATIONS:

Gestational diabetes:

Pre-eclampsia:

Gestational hypertension:

Placenta praevia:

Abruptio placenta:

Malpresentation:

DELIVERY DETAILS:

Induction of labour/ Augmentation of labour:

Indication of induction:

Heart rate/Respiratory rate of mother at the time of delivery:

Date of delivery:

NEONATE

Live born: Still born: Intrauterine death:

Apgar : 1 Min 5 Min

Gestational age at delivery:

Birth weight:

Sex of the baby: boy/girl

Admission in NICU:

Reason of admission in NICU:

No of days of admission in NICU:

Neonatal death:

Condition at discharge:

Date of discharge:

Duration of hospital stay:

ABBREVIATION

Ht- HEIGHT

GDM- GESTATIONAL DIABETES MELLITUS.

GHTN- GESTATIONAL HYPERTENSION

HB- HAEMOGLOBIN

SD –STANDARD DEVIATION

ADHD- ATTENTION DEFICIT HYPERACTIVE DISORDER

ASD- ATRIAL SEPTAL DEFECT

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S.NO	AGE	OBSTETRIC CODE	RISK FACTORS	Hypothyroid	GHTN	GDM`	Anaemia	HEIGHT IN cms	WEIGHT IN Kg	HB g/dl	TOTAL COUNT cells/mm3	PLATELETS cells/mm3	HEART RATE OF MOTHER AT THE TIME OF DELIVERY/min	RESPIRATORY RATE OF MOTHER AT THE TIME OF DELIVERY/min	MODE OF DELIVERY	AUGMENTATION OF LABOUR	SERUM BILIRUBIN IN NEWBORN g/dl	DAY OF LIFE	SERUM BILIRUBIN IN NEWBORN g/dl
1	28	PRIMI	Present	1	2	0	0	150	48	12.1	5000	2.21	88	18	Labour natural	Yes	15.00	1	>= 15
2	21	MULTI	Absent	0	0	0	0	160	64	10.1	6800	2	72	17	Caesarean section	No	12.00	1	< 15
3	20	MULTI	Present	0	0	0	0	148	68	11	10,000	2.45	90	18	Caesarean section	Yes	10.00	3	< 15
4	22	MULTI	Absent	0	0	0	0	150	58	9.8	7500	3.1	70	17	Labour natural	Yes	13.00	2	< 15
5	30	PRIMI	Absent	0	0	3	0	156	60	10.5	4000	1.9	99	16	Caesarean section	No	16.00	2	>= 15
6	25	MULTI	Absent	0	0	0	0	147	62	11.5	6000	2.75	68	16	Labour natural	No	14.00	2	< 15
7	35	MULTI	Present	0	2	3	4	152	42	8.5	5200	4.1	88	16	Labour natural	No	16.00	3	>= 15
8	22	MULTI	Absent	0	0	0	0	153	56	9.8	8000	3.2	100	17	Caesarean section	No	9.00	2	< 15
9	38	MULTI	Present	1	0	0	0	142	49	10.1	11,000	2.38	77	18	Labour natural	Yes	17.00	2	>= 15
10	24	MULTI	Absent	0	0	0	0	150	57	11.1	10,500	3.1	97	19	Caesarean section	No	14.00	5	< 15
11	19	PRIMI	Absent	0	0	0	4	152	56	7.8	5600	2.8	87	16	Labour natural	Yes	16.00	2	>= 15
12	24	MULTI	Absent	1	0	0	0	157	54	9.8	6400	3.2	88	16	Caesarean section	No	12.00	5	< 15

13	26	MULTI	Absent	0	0	0	0	168	58	11.2	7600	2.34	78	17	Caesarean section	No	16.00	6	>= 15
14	24	MULTI	Present	0	2	0	4	156	60	7.5	12,000	3.1	98	17	Labour natural	Yes	10.00	2	< 15
15	24	MULTI	Present	0	0	3	0	154	57	10.9	8000	2.8	99	18	Labour natural	Yes	15.00	7	>= 15
16	20	MULTI	Present	0	2	0	0	148	68	10.2	12,000	3.12	112	20	Caesarean section	Yes	13.00	2	< 15
17	21	MULTI	Absent	0	0	0	0	152	72	11	5400	2.45	83	21	Caesarean section	No	12.00	2	< 15
18	23	MULTI	Absent	0	0	0	0	164	58	12	10,000	3.25	75	17	Caesarean section	No	16.00	3	>= 15
19	25	MULTI	Absent	1	0	0	0	156	60	11.1	8000	2.51	75	19	Caesarean section	Yes	12.00	2	< 15
20	23	PRIMI	Absent	0	0	0	0	142	40	10.8	5,000	1.9	97	16	Caesarean section	No	11.00	2	< 15
21	29	MULTI	Present	0	0	0	4	154	70	7.1	9000	3.9	84	15	Caesarean section	Yes	16.00	3	>= 15
22	38	MULTI	Present	0	2	0	0	160	78	12.1	5,000	4.2	80	16	Caesarean section	No	13.00	2	< 15
23	21	MULTI	Absent	0	0	0	0	157	72	11.1	7700	1.8	82	18	Labour natural	No	8.00	2	< 15
24	28	MULTI	Absent	1	0	0	0	148	42	10.3	8,900	3.4	93	18	Caesarean section	Yes	12.10	3	< 15
25	27	MULTI	Absent	0	0	0	0	165	58	10.5	7600	5.1	92	17	Caesarean section	Yes	13.00	2	< 15
26	30	MULTI	Present	0	2	0	0	150	60	11	8,000	2.6	90	17	Labour natural	No	14.00	3	< 15
27	26	PRIMI	Absent	0	0	0	0	154	58	12	7600	3.1	70	16	Caesarean section	Yes	12.00	4	< 15
28	23	MULTI	Absent	0	0	0	0	150	54	10.4	9,000	2.9	108	18	Labour natural	No	10.00	2	< 15
29	20	MULTI	Absent	0	0	0	0	145	62	9.9	8700	2.7	90	18	Caesarean section	Yes	15.00	2	>= 15
30	22	MULTI	Absent	0	0	0	0	148	60	11	7,700	2.5	95	17	Labour natural	No	14.00	3	< 15
31	32	MULTI	Present	0	2	0	0	155	64	10.5	9,000	3.1	79	17	Caesarean section	No	17.00	2	>= 15
32	30	MULTI	Absent	0	0	0	0	160	58	11	8,500	4.2	94	16	Caesarean section	No	14.00	3	< 15
33	25	PRIMI	Absent	0	0	0	0	148	40	10	13,000	2.6	90	17	Caesarean section	Yes	13.00	2	< 15
34	22	MULTI	Absent	0	0	0	0	152	55	9.8	11,000	3.9	93	18	Labour natural	No	10.00	2	< 15
35	24	MULTI	Absent	0	0	0	0	167	60	10.7	7,000	3.6	92	16	Caesarean section	Yes	15.00	2	>= 15
36	28	PRIMI	Present	0	2	0	0	150	55	12.1	6500	2.8	77	17	Caesarean section	No	12.00	2	< 15
37	25	MULTI	Absent	0	0	0	0	161	70	10.1	5000	3.1	87	18	Caesarean section	Yes	16.00	3	>= 15
38	23	MULTI	Absent	0	0	0	0	154	48	11.1	6400	2.5	96	16	Labour natural	No	14.00	2	< 15
39	28	PRIMI	Present	0	2	0	0	148	58	10.8	7000	3.5	75	16	Labour natural	Yes	11.00	2	< 15
40	29	PRIMI	Absent	0	0	0	0	138	40	12.2	7600	2.5	90	17	Caesarean section	No	16.00	2	>= 15
41	21	MULTI	Absent	0	0	0	0	148	57	10.9	8000	3.3	104	16	Labour natural	No	15.00	3	>= 15
42	24	MULTI	Absent	0	0	0	0	150	38	11.1	5000	3.2	99	17	Caesarean section	No	13.00	2	< 15
43	31	MULTI	Present	0	2	0	0	155	56	9.8	6000	2.8	89	18	Caesarean section	Yes	16.00	3	>= 15
44	24	MULTI	Absent	0	0	0	0	159	54	10.7	6400	1.9	85	21	Labour natural	No	15.00	4	>= 15
45	27	PRIMI	Present	1	0	0	4	149	60	8.7	7500	2.1	78	22	Labour natural	Yes	14.00	2	< 15
46	30	MULTI	Absent	0	0	0	0	155	64	12.5	8000	3.5	90	16	Caesarean section	Yes	12.00	3	< 15
47	40	MULTI	Present	0	2	0	0	160	58	11.1	9000	4.1	97	16	Caesarean section	No	17.00	6	>= 15
48	34	MULTI	Absent	0	0	0	0	152	55	13.2	7400	2.5	74	17	Labour natural	Yes	11.00	2	< 15
49	31	PRIMI	Absent	0	0	0	0	150	58	12.5	8700	2.6	99	16	Caesarean section	Yes	14.00	2	< 15
50	29	MULTI	Present	1	2	0	0	146	38	9.7	10,000	2.9	95	18	Labour natural	No	12.00	2	< 15
51	24	MULTI	Absent	0	0	0	0	152	55	10.1	9700	3.4	96	17	Labour natural	No	15.00	3	>= 15
52	26	PRIMI	Present	0	0	0	0	158	54	12.5	6300	2.4	99	18	Caesarean section	Yes	13.00	2	< 15
53	28	MULTI	Present	0	2	0	0	148	56	11.2	7000	4.1	8	16	Caesarean section	No	16.00	3	>= 15
54	24	MULTI	Absent	0	0	0	0	150	50	10.5	12,000	3.5	90	17	Labour natural	No	15.00	2	>= 15

55	28	MULTI	Absent	0	0	0	0	145	70	11.1	4000	2.34	84	17	Labour natural	Yes	12.00	2	< 15
56	26	MULTI	Absent	0	0	0	0	150	80	13.1	5,500	3.1	82	17	Caesarean section	No	11.00	3	< 15
57	20	PRIMI	Absent	0	0	0	0	153	64	11.5	6,200	2.5	110	18	Labour natural	No	16.00	2	>= 15
58	26	MULTI	Present	0	2	0	0	148	65	12.1	8900	2.1	86	17	Caesarean section	No	9.00	1	< 15
59	28	MULTI	Absent	0	0	0	0	156	54	10.9	7600	3.8	88	16	Labour natural	Yes	14.00	3	< 15
60	29	PRIMI	Absent	0	0	0	0	151	50	11.5	8500	2.5	89	16	Caesarean section	No	12.00	2	< 15
61	21	MULTI	Absent	0	0	0	0	158	58	10.5	9000	2.75	97	18	Caesarean section	No	15.00	2	>= 15
62	25	PRIMI	Present	1	2	0	0	160	55	10.8	5400	1.6	79	19	Labour natural	Yes	8.00	3	< 15
63	26	MULTI	Absent	0	0	0	0	151	45	11.2	6000	2.1	99	16	Caesarean section	No	15.00	3	>= 15
64	19	PRIMI	Present	0	2	0	0	154	58	10.1	6700	2.75	87	17	Labour natural	No	13.00	2	< 15
65	29	MULTI	Absent	0	0	0	0	148	56	11.1	7800	3.1	89	16	Caesarean section	No	16.00	4	>= 15
66	25	MULTI	Absent	0	0	0	0	160	54	9.9	12,000	2.8	80	17	Labour natural	No	17.00	5	>= 15
67	28	MULTI	Absent	0	0	0	0	154	60	10.2	9400	3.1	92	18	Caesarean section	Yes	13.00	3	< 15
68	29	PRIMI	Absent	0	0	0	0	162	58	11.1	6800	2.8	82	19	Labour natural	No	15.00	2	>= 15
69	24	MULTI	Present	0	2	0	0	156	65	10.6	7500	2.3	77	16	Caesarean section	No	14.00	3	< 15
70	31	MULTI	Absent	0	0	0	0	158	61	11.5	8600	1.7	85	16	Labour natural	Yes	16.00	4	>= 15
71	35	PRIMI	Present	1	2	0	0	152	57	10.6	9500	2.5	78	17	Caesarean section	No	12.00	4	< 15
72	26	MULTI	Absent	0	0	0	0	150	64	11.1	7700	3.75	88	17	Caesarean section	No	17.00	3	>= 15
73	27	PRIMI	Present	1	0	0	0	148	58	12.5	9800	4.5	89	18	Labour natural	Yes	14.00	2	< 15
74	21	PRIMI	Absent	0	0	0	0	151	60	9.8	8500	2.65	90	18	Caesarean section	No	15.00	2	>= 15
75	25	MULTI	Absent	0	0	0	0	155	62	11.0	7900	4.1	97	16	Labour natural	Yes	11.00	2	< 15
76	27	PRIMI	Absent	0	0	0	0	160	67	10.5	8700	2.4	78	16	Labour natural	No	15.00	3	>= 15
77	36	MULTI	Present	0	2	0	0	158	45	11.1	4000	3.15	77	18	Caesarean section	No	16.00	3	>= 15
78	31	MULTI	Absent	0	0	0	0	162	58	9.8	7000	2.8	102	18	Caesarean section	Yes	14.00	2	< 15
79	29	MULTI	Absent	0	0	0	0	148	60	10.1	9400	2.9	110	17	Labour natural	No	12.00	1	< 15
80	19	PRIMI	Absent	0	0	0	0	160	76	11.1	11,000	4.2	98	17	Vaccum delivery	No	15.00	3	>= 15
81	23	MULTI	Absent	0	0	0	0	158	64	10.8	9400	2.6	89	18	Labour natural	No	13.00	2	< 15
82	33	MULTI	Absent	0	0	0	0	149	58	9.9	8700	2.7	82	19	Caesarean section	Yes	15.00	4	>= 15
83	28	PRIMI	Present	0	2	0	0	151	46	10.4	7500	3.1	104	19	Labour natural	No	14.00	3	< 15
84	25	MULTI	Absent	0	0	0	0	154	52	12.1	8100	4.1	84	21	Labour natural	Yes	16.00	2	>= 15
85	30	PRIMI	Absent	0	0	0	0	148	59	10.1	6700	2.75	78	17	Caesarean section	No	15.00	3	>= 15
86	37	MULTI	Present	1	0	3	0	150	68	9.9	8000	1.6	77	16	Caesarean section	Yes	17.00	2	>= 15
87	24	MULTI	Absent	0	0	0	0	140	58	11.2	7800	2.8	92	19	Caesarean section	No	18.00	7	>= 15
88	26	MULTI	Absent	0	0	0	0	155	56	10.5	6000	3.6	93	20	Labour natural	No	15.00	5	>= 15
89	28	MULTI	Absent	0	0	0	0	161	70	11.6	7600	3.6	112	16	Caesarean section	Yes	16.00	2	>= 15
90	29	PRIMI	Present	1	2	0	0	159	60	13.1	8700	4.2	94	17	Labour natural	No	14.00	4	< 15
91	33	MULTI	Absent	0	0	0	0	155	55	12.1	5600	3.14	95	18	Caesarean section	No	15.00	3	>= 15
92	22	PRIMI	Absent	0	0	0	0	153	45	13.1	6700	2.5	86	19	Labour natural	Yes	16.00	5	>= 15
93	29	PRIMI	Absent	0	0	0	0	136	65	11.6	8700	3.1	80	21	Labour natural	No	14.00	2	< 15
94	31	MULTI	Present	1	0	0	0	148	56	10.7	13,000	4.1	96	16	Labour natural	No	16.00	3	>= 15
95	34	PRIMI	Absent	0	0	0	0	154	80	12.3	9000	3.1	95	16	Caesarean section	No	17.00	5	>= 15
96	27	PRIMI	Absent	0	0	0	0	149	75	11.3	14,000	2.45	86	17	Labour natural	No	15.00	4	>= 15

97	23	MULTI	Present	1	2	0	0	155	49	10.5	6500	3.75	76	17	Labour natural	Yes	14.00	2	< 15
98	26	PRIMI	Absent	0	0	0	0	158	65	11.6	5400	2.5	79	18	Caesarean section	No	15.00	4	>= 15
99	32	MULTI	Absent	0	0	0	0	165	57	12.8	6500	4.1	85	19	Labour natural	No	16.00	2	>= 15
100	23	PRIMI	Absent	0	0	0	0	154	38	10.5	5900	3.2	84	19	Caesarean section	Yes	14.00	2	< 15
101	28	MULTI	Present	0	2	0	0	160	80	7.5	11,000	3.15	88	21	Labour natural	No	12.00	3	< 15
102	21	PRIMI	Absent	0	0	0	0	145	60	12.1	5400	2.7	82	20	Caesarean section	No	16.00	4	>= 15
103	29	PRIMI	Absent	0	0	0	0	150	54	11.1	6700	3.2	89	19	Labour natural	No	15.00	2	>= 15
104	29	MULTI	Present	1	0	0	0	156	58	11.6	7500	2.8	90	19	Labour natural	Yes	14.00	2	< 15
105	34	PRIMI	Present	0	2	0	0	165	65	12.5	8700	4.5	93	16	Caesarean section	No	15.00	3	>= 15
106	20	MULTI	Absent	0	0	0	0	155	57	12.6	6900	4.1	96	17	Labour natural	No	16.00	4	>= 15
107	27	MULTI	Absent	0	0	0	0	147	63	11.4	4500	3.15	76	18	Caesarean section	No	15.00	2	>= 15
108	29	MULTI	Absent	0	0	0	0	158	54	12.1	6500	2.6	89	18	Caesarean section	No	16.00	6	>= 15
109	32	PRIMI	Present	0	0	0	0	149	57	13.6	7400	3.6	99	19	Labour natural	Yes	14.00	4	< 15
110	20	PRIMI	Absent	0	0	0	0	135	50	12.1	5400	4.1	87	17	Caesarean section	No	17.00	5	>= 15
111	23	MULTI	Present	0	2	3	0	153	65	10.9	8700	3.15	86	18	vaccum delivery	No	16.00	3	>= 15
112	28	MULTI	Absent	0	0	0	0	160	59	13.6	6700	2.5	80	18	Labour natural	Yes	13.00	2	< 15
113	32	MULTI	Absent	0	0	0	0	156	64	13.4	10,000	3.4	90	17	Labour natural	No	15.00	2	>= 15
114	27	PRIMI	Absent	0	0	0	0	154	60	12.4	7800	4.1	97	16	Caesarean section	No	11.00	2	< 15
115	24	MULTI	Absent	0	0	0	0	160	50	11.4	6500	1.9	86	17	Labour natural	No	15.00	3	>= 15
116	23	MULTI	Present	0	2	0	0	158	75	10.9	12,000	2	97	18	Caesarean section	Yes	17.00	8	>= 15
117	29	MULTI	Absent	0	0	0	0	148	65	11.2	11,000	3.2	99	19	Caesarean section	No	14.00	6	< 15
118	32	MULTI	Absent	0	0	0	0	151	51	10.7	6,500	3.7	100	21	Labour natural	Yes	15.00	4	>= 15
119	21	MULTI	Absent	0	0	0	0	165	59	12.1	5,500	2.8	114	16	Labour natural	No	16.00	3	>= 15
120	33	PRIMI	Absent	0	0	0	0	156	54	13.1	6,700	3.1	75	17	Caesarean section	No	17.00	3	>= 15
121	28	PRIMI	Absent	0	0	0	0	148	50	11.1	7,800	4.1	85	20	Caesarean section	No	15.00	2	>= 15
122	25	MULTI	Absent	0	0	0	0	156	65	10.7	11,000	2.1	97	16	Caesarean section	Yes	16.00	4	>= 15
123	26	PRIMI	Absent	0	0	0	0	166	49	12.1	7,800	3.14	96	17	Labour natural	Yes	15.00	4	>= 15
124	24	MULTI	Absent	0	0	0	0	159	66	10.9	8,900	2.8	87	16	Caesarean section	No	16.00	5	>= 15
125	28	PRIMI	Absent	0	0	0	0	167	70	11.1	7,600	3.1	79	18	Labour natural	Yes	15.00	6	>= 15
126	31	MULTI	Present	1	0	3	0	155	66	12.1	8,900	2.87	98	17	Labour natural	No	15.00	3	>= 15
127	33	MULTI	Absent	0	0	0	0	160	72	13.1	5,400	3.1	79	16	Caesarean section	No	16.00	2	>= 15
128	23	MULTI	Present	0	0	3	4	154	65	6.8	7,400	1.9	88	15	Caesarean section	No	15.00	4	>= 15
129	29	PRIMI	Absent	0	0	0	0	161	56	12.1	7,900	3.4	90	19	Labour natural	Yes	14.00	2	< 15
130	21	MULTI	Absent	0	0	0	0	158	55	13.6	8,600	2.6	75	16	Caesarean section	Yes	16.00	2	>= 15
131	35	MULTI	Absent	0	0	0	0	155	54	13.1	7,500	3.1	85	17	Labour natural	No	15.00	3	>= 15
132	27	MULTI	Absent	0	0	0	0	168	80	12.7	8,700	2.67	95	18	Caesarean section	No	16.00	4	>= 15
133	24	MULTI	Absent	0	0	0	0	158	65	13.7	10,000	1.89	94	19	Caesarean section	Yes	15.00	3	>= 15
134	30	PRIMI	Absent	0	0	0	0	146	43	10.5	6,400	3.12	79	16	Labour natural	No	17.00	3	>= 15
135	29	PRIMI	Absent	0	0	0	0	151	58	12.7	7,800	2.76	77	17	Caesarean section	No	16.00	2	>= 15
136	31	MULTI	Present	1	0	0	0	148	55	13.2	6,700	3.7	87	18	Labour natural	No	15.00	3	>= 15
137	27	PRIMI	Absent	0	0	0	0	142	67	12.8	7,800	1.7	77	19	Labour natural	Yes	15.00	2	>= 15

138	31	MULTI	Present	0	0	3	0	155	65	11.5	9,800	3.5	69	16	Caesarean section	No	16.00	3	>= 15
139	33	PRIMI	Absent	0	0	0	0	161	70	10.6	6,500	2.54	78	17	Caesarean section	No	16.00	2	>= 15
140	29	MULTI	Absent	0	0	0	0	152	65	11.3	5,400	3.1	84	16	Labour natural	No	15.00	3	>= 15
141	23	MULTI	Present	1	0	0	0	150	58	12.1	6,500	3.4	88	17	Caesarean section	Yes	15.00	3	>= 15
142	27	MULTI	Absent	0	0	0	0	159	70	11.5	5,400	4.1	80	15	Labour natural	No	16.00	2	>= 15
143	20	MULTI	Present	0	0	3	0	150	65	12.1	7,600	3.1	87	18	Caesarean section	No	17.00	5	>= 15
144	24	MULTI	Absent	0	0	0	0	156	55	13.6	7,600	2.65	89	17	Labour natural	Yes	15.00	2	>= 15
145	28	MULTI	Absent	0	0	0	0	159	43	11.9	5,600	3.1	90	17	Labour natural	No	16.00	3	>= 15
146	29	PRIMI	Absent	0	0	0	0	165	59	12.7	4,500	1.89	93	19	Caesarean section	Yes	15.00	2	>= 15
147	23	MULTI	Present	1	0	3	0	155	45	10.5	8,700	2.5	94	17	Caesarean section	No	17.00	6	>= 15
148	22	PRIMI	Absent	0	0	0	0	170	68	12.3	6,700	3.2	97	1817	Labour natural	No	16.00	2	>= 15
149	29	PRIMI	Present	0	2	0	0	150	55	11.2	8,500	4.1	89	16	Caesarean section	Yes	15.00	3	>= 15
150	33	MULTI	Absent	0	0	0	0	152	65	10.8	6,700	2.45	88	17	Caesarean section	Yes	15.00	4	>= 15
151	31	MULTI	Absent	0	0	0	0	155	48	11.7	8,700	1.89	94	18	Caesarean section	No	15.00	3	>= 15
152	26	PRIMI	Absent	0	0	0	0	148	58	10.6	10,000	3.15	93	16	Caesarean section	No	16.00	5	>= 15
153	21	PRIMI	Absent	0	0	0	0	159	52	12.1	7,600	2.45	95	17	Labour natural	Yes	15.00	3	>= 15
154	29	MULTI	Absent	0	0	0	0	162	55	11.6	6,900	3.7	90	18	Labour natural	No	14.00	4	< 15
155	36	PRIMI	Present	1	0	3	0	158	72	13.6	5,600	4.5	96	16	Labour natural	No	16.00	4	>= 15
156	30	MULTI	Absent	0	0	0	0	157	74	12.1	6,400	3.16	90	18	Caesarean section	No	16.00	3	>= 15
157	25	MULTI	Absent	0	0	0	0	148	68	13.6	6,400	4.1	93	19	Labour natural	No	15.00	3	>= 15
158	31	PRIMI	Absent	0	0	0	0	140	65	14.1	7,800	3.78	90	17	Caesarean section	No	15.00	4	>= 15
159	26	PRIMI	Absent	0	0	0	0	160	57	12.7	8,700	2.78	88	16	Labour natural	No	13.00	2	< 15
160	18	MULTI	Absent	0	0	0	0	152	55	8.2	5,600	2.15	78	18	Labour natural	No	16.00	2	>= 15
161	31	MULTI	Absent	0	0	0	0	149	52	12.7	5,900	2.87	76	19	Labour natural	No	15.00	5	>= 15
162	33	MULTI	Present	0	2	0	0	156	59	13.6	6,800	4.1	79	21	Caesarean section	No	16.00	6	>= 15
163	25	PRIMI	Absent	0	0	0	0	154	58	13.1	9,800	3.5	90	16	Labour natural	Yes	15.00	3	>= 15
164	27	PRIMI	Present	1	0	0	0	160	58	12.7	6,500	3.2	89	17	Caesarean section	No	15.00	3	>= 15
165	33	MULTI	Present	0	0	3	0	158	62	13.7	11,000	2.76	78	18	Labour natural	No	16.00	4	>= 15
166	28	PRIMI	Absent	0	0	0	0	167	68	12.7	9,800	3.17	87	16	Labour natural	No	15.00	5	>= 15
167	31	MULTI	Absent	0	0	0	0	154	54	11.3	8,700	2.75	88	17	Caesarean section	No	17.00	3	>= 15
168	29	MULTI	Absent	0	0	0	0	157	57	12.1	5,600	3.12	95	19	Labour natural	No	15.00	2	>= 15
169	37	MULTI	Absent	0	0	0	0	150	76	10.8	6,700	2.45	97	20	Caesarean section	No	15.00	3	>= 15
170	27	PRIMI	Absent	0	0	0	0	151	68	12.3	8,700	2.15	90	16	Labour natural	Yes	12.00	2	< 15
171	23	MULTI	Absent	0	0	0	0	159	71	11.8	7,900	3.15	97	17	Labour natural	No	16.00	3	>= 15
172	28	MULTI	Absent	0	0	0	0	162	56	12.7	6,300	2.89	99	16	Labour natural	Yes	15.00	5	>= 15
173	34	PRIMI	Absent	0	2	0	0	159	65	13.1	7,800	2.45	73	19	Caesarean section	No	16.00	3	>= 15
174	35	MULTI	Present	0	0	3	0	158	58	12.5	6,700	3.15	78	17	Labour natural	No	15.00	2	>= 15
175	28	PRIMI	Absent	0	0	0	0	154	60	11.8	8,600	3.17	76	16	Labour natural	No	16.00	4	>= 15
176	21	MULTI	Absent	0	0	0	0	157	58	10.7	9,000	2.8	78	18	Labour natural	No	16.00	2	>= 15
177	28	PRIMI	Absent	0	0	0	0	160	75	11.3	10,000	3.1	99	21	Caesarean section	No	15.00	2	>= 15
178	29	MULTI	Absent	0	0	0	0	148	60	10.7	6,500	2.8	75	16	Labour natural	Yes	12.00	2	< 15
179	32	MULTI	Absent	0	0	0	0	151	65	10.4	8,700	2.4	98	17	Caesarean section	No	17.00	4	>= 15

180	29	PRIMI	Present	0	2	0	0	161	51	11.5	5,400	2.7	90	18	Labour natural	Yes	14.00	3	< 15
181	24	MULTI	Absent	0	0	0	0	143	70	10.8	6,700	3.2	89	19	Labour natural	No	16.00	4	>= 15
182	25	MULTI	Absent	0	0	0	0	155	65	11.2	5,900	2.76	98	21	Caesarean section	No	15.00	3	>= 15
183	37	PRIMI	Absent	0	0	0	0	159	49	10.5	12,000	1.9	78	19	Labour natural	No	16.00	3	>= 15
184	31	PRIMI	Present	0	2	0	0	150	55	13.1	7,600	2.5	77	20	Caesarean section	No	12.00	2	< 15
185	29	MULTI	Absent	0	0	0	0	160	65	12.5	7,800	4.5	86	16	Labour natural	Yes	16.00	3	>= 15
186	26	MULTI	Absent	0	0	0	0	153	62	12.5	6,700	3.7	83	17	Labour natural	No	15.00	5	>= 15
187	22	MULTI	Absent	0	0	0	0	159	60	13.1	8,700	2.15	96	16	Caesarean section	No	15.00	3	>= 15
188	23	MULTI	Present	1	2	3	0	156	59	12.9	9,000	2.76	90	18	vaccum delivery	No	16.00	2	>= 15
189	29	MULTI	Absent	0	0	0	0	154	57	11.7	7,600	3.1	80	16	Caesarean section	No	15.00	4	>= 15
190	31	PRIMI	Absent	0	0	0	0	151	60	12.1	8,900	2.76	70	16	Labour natural	No	14.00	3	< 15
191	30	PRIMI	Absent	0	0	0	0	148	59	11.8	7,600	3.1	78	17	Labour natural	Yes	13.00	3	< 15
192	31	MULTI	Absent	0	0	0	0	151	62	12.1	9,800	2.89	79	18	Caesarean section	No	16.00	5	>= 15
193	30	PRIMI	Absent	0	0	3	0	157	60	10.7	11,000	3.17	87	16	Labour natural	No	16.00	2	>= 15
194	29	PRIMI	Absent	0	0	0	0	160	57	13.2	6,500	2.14	88	19	Caesarean section	Yes	15.00	4	>= 15
195	21	MULTI	Absent	0	0	0	0	151	45	12.7	8,700	4.5	99	21	Labour natural	No	15.00	3	>= 15
196	27	MULTI	Absent	0	0	0	0	155	56	11.2	9,800	3.1	89	20	Labour natural	No	16.00	2	>= 15
197	23	MULTI	Present	1	0	0	0	150	52	10.6	13,500	2.14	85	16	Caesarean section	Yes	14.00	3	< 15
198	26	MULTI	Absent	0	0	0	0	158	65	11.6	9,800	1.87	78	18	Labour natural	No	13.00	2	< 15
199	21	PRIMI	Absent	0	0	0	0	149	61	10.7	7,500	2.3	76	19	Labour natural	No	15.00	4	>= 15
200	29	MULTI	Present	0	0	0	4	152	58	8.8	6,500	3.1	70	21	Labour natural	No	17.00	3	>= 15
201	36	PRIMI	Absent	0	0	0	0	159	60	13.1	7,600	2.65	76	20	Labour natural	No	14.00	5	< 15
202	31	MULTI	Absent	0	0	0	0	148	58	12.6	9,800	3.67	85	17	Caesarean section	No	16.00	4	>= 15
203	32	PRIMI	Absent	0	0	0	0	156	59	13.1	11,000	2.78	84	18	Labour natural	Yes	17.00	2	>= 15
204	23	MULTI	Absent	0	0	3	0	148	60	12.8	5,600	3.15	83	19	Caesarean section	No	14.00	3	< 15
205	25	MULTI	Absent	0	0	0	0	150	45	12.5	6,500	2.6	89	19	Labour natural	No	16.00	3	>= 15
206	28	PRIMI	Absent	0	0	0	0	151	40	11.8	7,800	3.1	80	16	Caesarean section	No	12.00	2	< 15
207	31	MULTI	Absent	0	0	0	0	148	60	10.6	9,800	2.76	78	17	Labour natural	No	15.00	4	>= 15
208	30	MULTI	Absent	0	0	0	0	155	55	12.3	8,700	3.12	94	18	Labour natural	No	14.00	3	< 15
209	34	MULTI	Present	0	2	0	0	156	65	10.7	6,700	2.76	90	19	Labour natural	No	11.00	3	< 15
210	29	PRIMI	Absent	0	0	0	0	161	58	11.2	6,500	3.6	84	21	Caesarean section	Yes	15.00	6	>= 15
211	24	MULTI	Absent	0	0	0	0	154	60	10.9	9,800	3.15	95	17	Labour natural	No	16.00	4	>= 15
212	18	MULTI	Present	1	0	3	0	150	58	10.5	7,600	2.17	97	18	Labour natural	Yes	15.00	3	>= 15
213	28	PRIMI	Absent	0	0	0	0	156	55	11.7	7,800	2.18	99	17	Caesarean section	No	17.00	4	>= 15
214	26	MULTI	Absent	0	0	0	0	158	65	12.4	9,800	3.16	78	19	Labour natural	Yes	15.00	3	>= 15
215	30	MULTI	Absent	0	0	0	0	161	58	11.9	6,700	2.78	75	16	Caesarean section	No	14.00	4	< 15
216	32	PRIMI	Absent	0	0	0	0	158	54	12.3	7,500	2.54	73	17	Labour natural	No	15.00	3	>= 15
217	19	PRIMI	Absent	0	0	0	0	155	50	11.5	8,500	3.16	77	18	Caesarean section	Yes	15.00	5	>= 15
218	23	MULTI	Absent	0	0	0	0	150	78	10.7	7,500	2.78	90	19	Labour natural	Yes	17.00	5	>= 15
219	28	MULTI	Absent	0	0	0	0	149	60	11.3	6,700	3.12	98	17	Caesarean section	No	14.00	4	< 15
220	27	MULTI	Absent	0	0	0	0	152	59	12.8	8,700	2.17	76	16	Labour natural	Yes	16.00	4	>= 15
221	29	PRIMI	Absent	0	0	0	0	161	61	11.9	6,700	3.16	75	18	Labour natural	No	15.00	3	>= 15

222	30	PRIMI	Present	1	0	0	0	159	57	11.2	9,800	2.76	87	20	Caesarean section	No	14.00	4	< 15
223	31	MULTI	Absent	0	0	0	0	150	55	10.8	6,800	3.12	96	16	Caesarean section	Yes	16.00	2	>= 15
224	27	PRIMI	Absent	0	0	0	0	151	56	11.2	8,900	2.67	90	17	Labour natural	No	15.00	3	>= 15
225	22	PRIMI	Absent	0	0	0	0	138	48	13.1	5,600	2.1	87	19	Caesarean section	No	16.00	2	>= 15
226	29	MULTI	Absent	0	0	0	0	157	61	12.9	6,700	3.17	83	20	Labour natural	No	15.00	3	>= 15
227	32	PRIMI	Absent	0	0	0	0	154	52	11.7	7,600	2.76	94	17	Caesarean section	No	13.00	2	< 15
228	35	MULTI	Absent	0	0	0	0	160	54	12.1	8,500	3.14	99	16	Caesarean section	Yes	12.00	1	< 15
229	27	PRIMI	Absent	0	0	0	0	155	67	13.4	7,600	3.76	110	18	Labour natural	No	15.00	4	>= 15
230	28	PRIMI	Present	1	0	0	0	159	70	12.5	9,000	3.78	90	16	Labour natural	Yes	16.00	3	>= 15
231	34	MULTI	Present	0	0	3	0	161	64	11.8	7,800	2.89	94	15	Caesarean section	No	17.00	3	>= 15
232	26	PRIMI	Absent	0	0	0	0	158	61	12.8	6,900	4.1	82	16	Labour natural	No	15.00	4	>= 15
233	27	MULTI	Absent	0	0	0	0	154	52	11.7	5,600	3.76	889	17	Caesarean section	Yes	17.00	3	>= 15
234	30	MULTI	Absent	0	0	0	0	150	70	10.5	10,000	3.9	99	15	Caesarean section	No	15.00	2	>= 15
235	31	PRIMI	Present	0	0	3	0	149	57	11.9	8,900	2.89	88	18	Caesarean section	No	14.00	3	< 15
236	30	MULTI	Absent	0	0	0	0	152	59	12.1	9,800	3.1	97	17	Labour natural	Yes	15.00	2	>= 15
237	24	PRIMI	Absent	0	0	0	0	145	50	14.5	12,000	3.76	90	16	Caesarean section	No	16.00	3	>= 15
238	27	MULTI	Absent	0	0	0	0	150	54	12.7	7,600	2.5	94	18	Caesarean section	Yes	15.00	2	>= 15
239	29	MULTI	Present	1	0	0	0	156	58	11.8	8,700	2.78	86	16	Labour natural	No	16.00	3	>= 15
240	26	PRIMI	Absent	0	0	0	0	150	55	12.1	7,600	2.8	80	18	Labour natural	Yes	15.00	4	>= 15
241	31	MULTI	Absent	0	0	0	0	160	75	10.7	8,700	3.18	79	16	Caesarean section	No	14.00	3	< 15
242	35	MULTI	Present	1	2	0	4	158	60	7.9	7,800	2.78	70	15	Caesarean section	No	16.00	6	>= 15
243	30	MULTI	Absent	0	0	0	0	154	58	12.8	8,700	3.7	94	14	Caesarean section	No	15.00	5	>= 15
244	31	MULTI	Absent	0	0	0	0	150	55	11.5	7,600	2.16	83	16	Caesarean section	Yes	14.00	4	< 15
245	26	MULTI	Absent	0	0	0	0	156	70	12.5	8,700	3.1	76	18	Caesarean section	No	16.00	5	>= 15
246	28	PRIMI	Absent	0	0	0	0	149	58	11.9	7,500	2.78	72	16	Labour natural	Yes	15.00	6	>= 15
247	24	MULTI	Present	1	0	0	0	150	55	12.8	8,900	3.17	83	`17	Caesarean section	Yes	16.00	5	>= 15
248	35	MULTI	Absent	0	0	0	0	160	69	12.7	8,800	2.89	93	16	Labour natural	No	14.00	2	< 15
249	31	PRIMI	Absent	0	0	0	0	155	62	11.8	5,600	1.78	65	18	Caesarean section	Yes	15.00	2	>= 15
250	29	MULTI	Absent	0	0	0	0	150	55	12.1	6,700	2.3	98	17	Caesarean section	No	16.00	3	>= 15

CONSENT FORM

I agree to participate in the study entitled **" Study of maternal risk factors associated with development of neonatal jaundice".** I confirm that I have been told about this study in my mother tongue and have had the opportunity to clarify my doubts . I understand that my participation is voluntary and I may refuse to participate at any time without giving any reasons and without affecting my benefits. I agree not to restrict the use of any data or results that arise from this study.

Name of the participant:

Signature/ Thumbprint:

Name of the Investigator: Dr. Soumya

Sign of the Investigator:

ஒப்புதல்படிவம்

நான் இந்த ஆராய்ச்சியின் முழுவிவரம் பற்றி அறிந்து கொண்டேன். இந்த ஆராய்ச்சியில் எந்தபின்விளைவும் இல்லை என்பதை புரிந்து கொண்டேன்.

இந்த ஆராய்ச்சிக்கு எந்த பணமோ பொருளோ கிடைக்காது என்பதையும் அறிந்து கொண்டேன்.

இந்த ஆராய்ச்சியில் கேட்கப்படும் கேள்விகளுக்கு என்னால் முயன்ற வரை உண்மை விவரம் அளிப்பேன் என்பதை உறுதியளிக்கிறேன்.

என் முழுமனதுடன் இந்த ஆராய்ச்சிக்கு ஒத்துழைப்பை அளிக்கிறேன்.

GOVERNMENT STANLEY MEDICAL COLLEGE & HOSPITAL,CHENNAI_-01

INSTITUTIONAL ETHICS COMMITTEE

TITLE OF THE WORK	: "A STUDY TO IDENTIFY MATERNAL RISK FACTORS ASSOCIATED WITH DEVELOPMENT OF NEONATAL JAUNDICE"
PRINCIPAL INVESTIGATOR	: DR.P.SOUMYA,
DESIGNATION	: PG IN OBSTETRICS AND GYNAECOLOGY ,
DEPARTMENT	: DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY, GOVT. STANLEY MEDICAL COLLEGE.

The request for an approval from the Institutional Ethical Committee (IEC) was considered on the IEC meeting held on 03.11.2020 at the Council Hall, Stanley Medical College, Chennai-1 at 10am.

The members of the Committee, the secretary and the Chairman are pleased to approve the proposed work mentioned above, submitted by the principal investigator.

The Principal investigator and their team are directed to adhere to the guidelines given below:

1. You should inform the IEC in case of changes in study procedure, site investigator investigation or guide or any other changes.
2. You should not deviate from the area of the work for which you applied for ethical clearance.
3. You should inform the IEC immediately, in case of any adverse events or serious adverse reaction.
4. You should abide to the rules and regulation of the institution(s).
5. You should complete the work within the specified period and if any extension of time is required, you should apply for permission again and do the work.
6. You should submit the summary of the work to the ethical committee on completion of the work.

MEMBER SECRETARY,
IEC, SMC, CHENNAI

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