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Original Research Article

Study of Clinical Profile of Neonates with Transient Tacypnea of Newborn at a Rural Tertiary Care Teaching Centre in South West Bihar

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Abstract

Introduction: Transient tachypnea of newborn is the most common etiology for respiratory distress in a newborn. It occurs due to delayed clearance of foetal lung fluid. It is characterised by early onset tachypnea(>60 breaths/min), sometimes with retractions, grunting, minimal cyanosis that is usually relieved by oxygen supplementation within 48-72 hrs. It occurs in preterm and term infants(between 34 to 42 weeks of gestation).

Aim: To study the incidence, risk factors and outcome of transient tachypnea of newborn (TTN)

Objectives: To study and analyse the incidence and risk factors associated with TTN and analyse the outcomes of babies suffering from TTN.

Materials and Methods: A prospective observational study to assess incidence, risk factors and outcome of neonates diagnosed with TTN(born between 34 to 42 weeks of gestation) admitted in department of Pediatrics over a period of 18 months(01 November 2022-31 April 2023).

Results: In this study 102 neonates diagnosed with TTN were admitted in NICU. Common risk factors were studied.TTN was present in 79 neonates (77.5%) delivered via cesarean section, 53 neonates (52%) were late preterm, 66 neonates (64.7%) were male. Maternal diseases like diabetes was present in mothers of 11 neonates (10.8%), maternal PIH in 17 neonates (16.7%) and maternal asthma in 15 neonates (14.7%). Multiple gestation was seen in 55 (53.9%). Most of the neonates were discharged in clinically stable condition, 96 neonates (94.1%) were discharged and no mortality was observed.

Conclusion: From this study it can be inferred that TTN is a common respiratory disorder and risk factors like cesarean section, preterm delivery, male gender and maternal comorbidities have its role. TTN has an excellent prognosis.

Abbreviations: TTN-transient tachypnea of newborn, RDS- respiratory distress syndrome, CPAP- Continue Positive Airway Pressure, SpO2-Oxygen saturation, SA- Silvermann Anderson, NICU- Neonatal intensive care unit, FiO2-Fraction of inspired oxygen, LAMA-left against medical advice.

Introduction

Transient tachypnea of newborn (TTN) is a clinical syndrome of self-limited tachypnea associated with delayed clearance of foetal lung fluid. It is characterised by early onset of Tachypnea (>60 breaths/min) sometimes with retractions or expiratory grunting and occasionally with cyanosis that is relieved by minimal Oxygen supplementation.[1] TTN occurs in late preterm infants (Born between 34 to 37 weeks of gestation) and term infants (Born between 37 to 42 weeks of gestation).

Before birth, airway liquid plays a critical role in fetal lung growth and development by maintaining the lungs in a distended state. Increased lung distension is a potent stimulus for fetal lung growth.

After birth, lung liquid is rapidly replaced with air (within minutes) from the airways into the surrounding lung tissue, from where the lung fluid is cleared over the next 4 to 6 hours via the lymphatics and vasculature [2,3].Transient tachypnea of newborn (TTN) is the most common cause for respiratory distress in a newborn. The estimated incidence of TTN of all deliveries has been reported to be 4.3% higher than normal (0.3-2.8%) in tertiary care institutes in India. Of all the causes of respiratory distress, TTN amounted to

35.3% of the etiologies in a study conducted in Bihar.[4]

Common risk factors for TTN include Cesarean delivery, late preterm birth and birth following rapid labour. Due to these conditions, there is absence of hormonal changes which occur during spontaneous labour, resulting in delayed fetal lung fluid clearance. Also, delivery at lower gestational age and maternal hypotension during spinal anaesthesia increase the risk of TTN. Other risk factors include male gender, family history of asthma, which is related to altered sensitivity to catecholamines, that play a role in foetal lung fluid clearance. Lower gestational age, macrosomia, multiple gestations, maternal diabetes also increase the risk of TTN.[5]

Diagnosis of TTN is based on clinical and radiological features and on exclusion. Chest X-ray features include diffuse streaks of perihilar interstitial opacities (sunburst appearance) and fluid in the interlobar fissures. This is due to the retained lung fluids which engorge the lymphatics and the capillaries. Some degree of hyperinflation with fluid in costophrenic angles may be present. Mild cardiomegaly might be present. rapid clearing of the successive chest X-rays within 48-72 hours is a hallmark of TTN.[6]

Management is supportive and most neonates require supplemental oxygen with fraction of inspired oxygen (FiO2) no more than 0.40 (40%) [7]. An alternative or additional diagnosis is considered in an infant who is deteriorating or requires mechanical ventilation. Full recovery is expected in a neonate with TTN using supportive care.[8]

Studies have not been conducted in the region of South West Bihar regarding estimation of incidence, risk factors and outcomes of TTN in Neonates. As there is paucity of published studies regarding the same in South West Bihar, this study was planned with the aim to find out the incidence, risk factors and outcome of TTN in Neonates.

Aim: Study the incidence, risk factors and outcomes of transient tachypnea of Newborn.

Objectives

- Study the incidence of Transient Tachypnea of Newborn
- Analyse the risk factors associated with Transient Tachypnea of Newborn
- Analyse the outcomes of babies suffering from Transient Tachypnea and duration of hospital stay in these neonates.

Material and Methods

This was a prospective observational study to assess the incidence, risk factors and outcomes of newborns suffering from transient tachypnea over the period of 18 months (1st November 2022- 30th April 2024) at NICU of a tertiary care teaching hospital in a rural area of Bihar.

Late preterm (POG b/w 34 weeks to 37weeks) and Term (POG b/w 37 weeks to 42 weeks) infants born with the increased respiratory rate are being enrolled in this study. After admission in NICU, they are being provided with Oxygen support and are being observed for over a period of 48-72 hours. If oxygen requirement decreases, the oxygen is weaned off gradually within this time period and if they are maintaining saturation on room air with no evidence of sepsis they are being enrolled in the study, rest are excluded.

Study design: Hospital based prospective observational study.

Place of study:
The study is being conducted in Level III Neonatal Intensive Care Unit (NICU), Department of Pediatrics, Narayan Medical College & Hospital, Jamuhar, Bihar.

Duration of study:
Study was conducted over a period of 18months(01 November 2022- 30 April 2024).

Study Population:
Neonates admitted in neonatal intensive care unit (NICU) of NMCH, Jamuhar with diagnosis of Transient Tachypnea of Newborns.

Inclusion Criteria

- Neonates who completed 34 weeks of gestational age.
- Neonates with Respiratory distress at the time of admission (RR>60/min, grunting, nasal flaring and chest retractions).

Exclusion Criteria

- Early preterm babies (<34 weeks of Gestation)
- Babies who had metabolic disorders (Inborn error of metabolism, galactosemia etc.), surgical problems, chromosomal and congenital anomalies or dysmorphism were excluded.
- Babies born with perinatal asphyxia
- Babies with pneumonia
- Babies who require Intubation
- Babies born with sepsis
- Babies born with congenital heart diseases
- Babies with Meconium Aspiration Syndrome
- Mother had history of taking Anti-convulsant.

Statistical Analysis: Appropriate statistical method was applied for analysis of data. Statistical significance is taken if p value is < 0.05.

Standard statistical methods were used for calculating statistical constants. All the data were

extended on an excel spreadsheet and analyzed using the SPSS package (Stata, version 27.0 SPSS INC, Chicago, IL, USA) for windows. Descriptive and inferential statistical analysis has been carried out in the present study. Chi Square test was used to test statistical significance of variable like hospital stay, oxygen requirement etc.

Results

There were 102 patients with transient tachypnea of newborn were included in the study.

Table 1: Distribution of patients according to gender

Gender	Neonates with TTN(n)	Neonates with TTN (n %)
Male	66	64.7
Female	36	35.3
Total	102	100.0

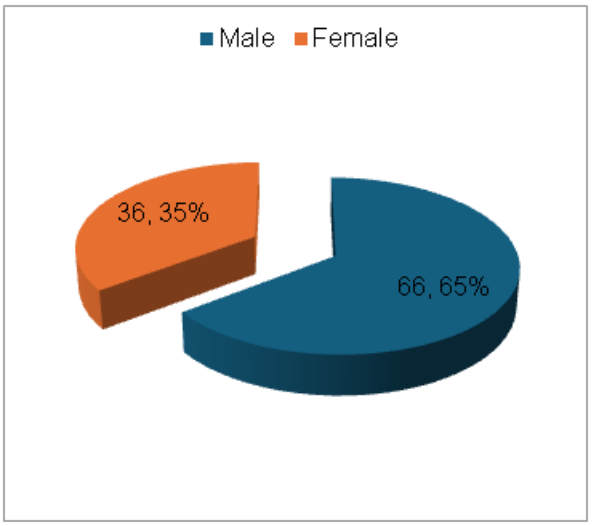

Figure 1: Distribution of patients according to gender

In this study out of 102 neonates admitted in NICU with TTN, 66 (64.7%) were male and 36(35.3% were female shown above in Table 1.

Table 2: Distribution of patients according to mode of delivery

Mode of delivery	Frequency	Percent
VD	23	22.5
LSCS	79	77.5

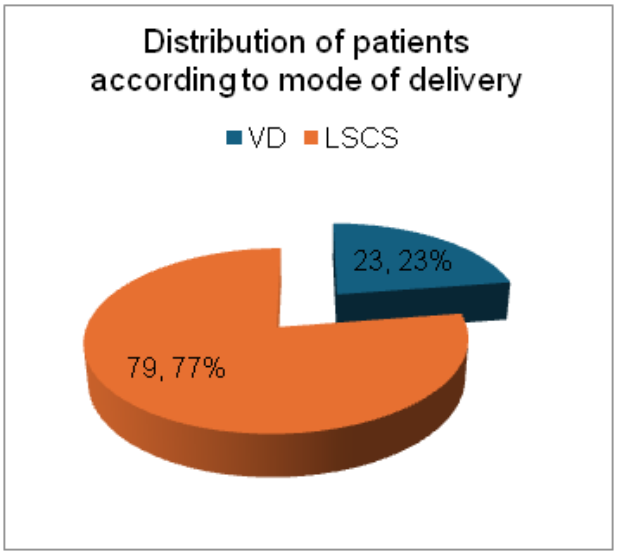

Figure 2: Distribution of patients according to mode of delivery

Out of 102 neonates 79(77.5 %) were born via cesarian delivery and 23(22.5%) were born via vaginal delivery shown above in Table 2.

Table 3: Distribution of patients according to singleton/twin birth

Single/Twin	Neonates with TTN(n)	Neonates with TTN(n %)
Single	88	86.3
Twin	14	13.7
Total	102	100.0

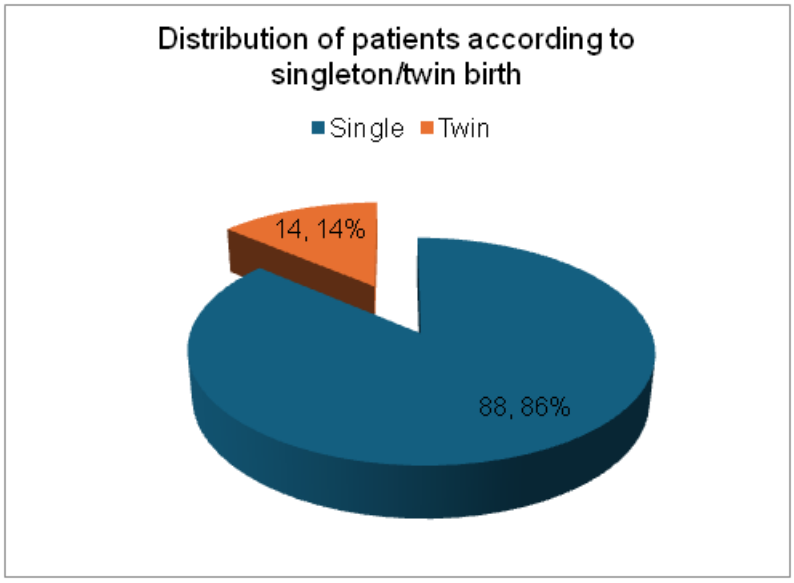

Figure 3: Distribution of patients according to singleton/twin birth

In our study 88(86.3%) neonates with TTN were Single and 14(13.7%) were twinsand TTN was twin birth was also found as a risk factor for the development of TTN as shown above in Table 3.

Table 4: Distribution of patients according to Inborn/Out born hospital delivery

Inborn/Outborn	Frequency	Percent
Inborn	69	67.6
Outborn	33	32.4
Total	102	100.0

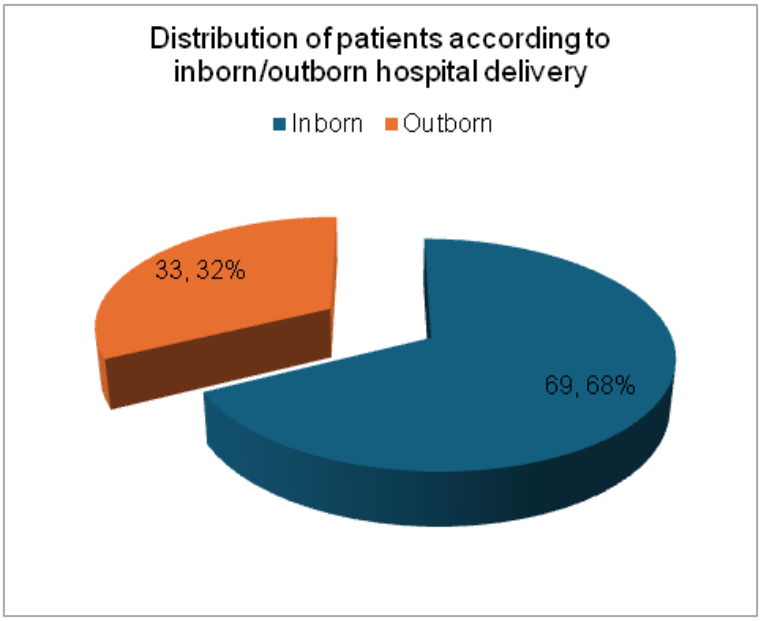

Figure 4: Distribution of patients according to Inborn/Out born Hospital Delivery

In our study out of the neonates with TTN 69(67.6%) were Inborn and 33(32.4%) were out born. Inborn cases admitted with TTN were more in number as compared to Out-born cases as shown in Table 4.

Table 5: Distribution of patients according to gestational age

Gestational age	Neonates with TTN(n)	Neonates with TTN(n %)
Term	49	48.0
Late Preterm	53	52.0
Total	102	100.0

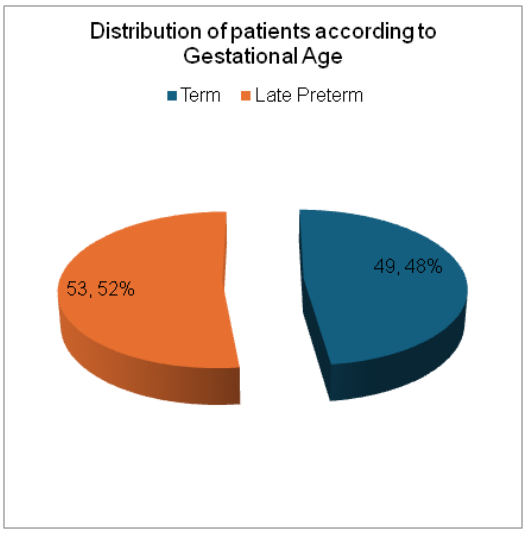

Figure 5: Distribution of patients according to gestational age

Out of the 102 neonates TTN was found in 49(48%) of term and 53(52%) of late preterm neonates as shown above in Table 5.

Table 6: Distribution of neonates with TTN according to the respiratory rate

Respiratory rate	Neonates with TTN(n)	Neonates with TTN(n %)
<60/min	4	3.9
60-80/min	87	85.3
>80/min	11	10.8
Total	102	100.0

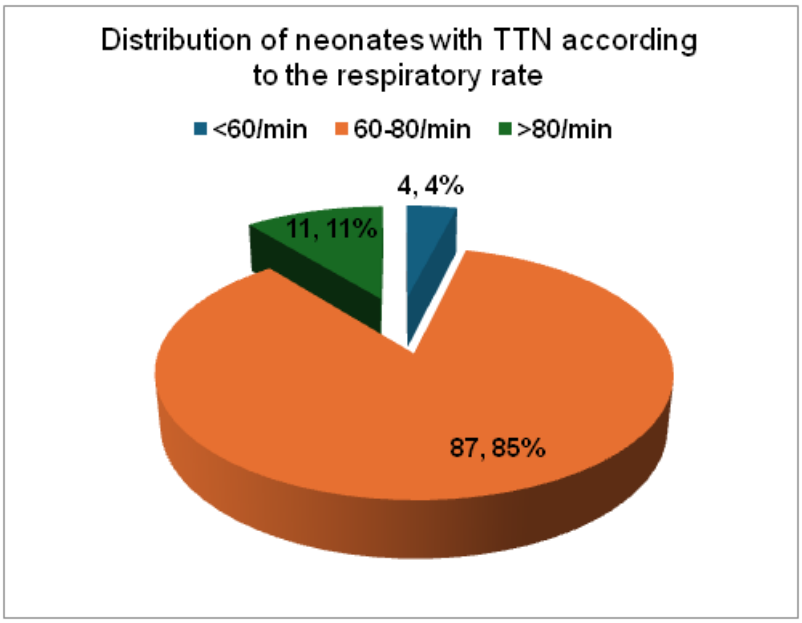

Figure 6: Distribution of neonates with TTN according to Respiratory rate

Out of 102 neonates in our study 4(3.9%) neonates had respiratory rate <60/min,87(85.3%) had respiratory rate 60-80/min and 11(10.8%) had respiratory rate >80/min as shown in Table 6 above.

Table 7: Distribution of neonates with TTN according to severity of chest retractions

Chest Retractions	Neonates with TTN(n)	Neonates with TTN(n %)
Mild	40	39.2
Moderate	53	52.0
Severe	9	8.8
Total	102	100.0

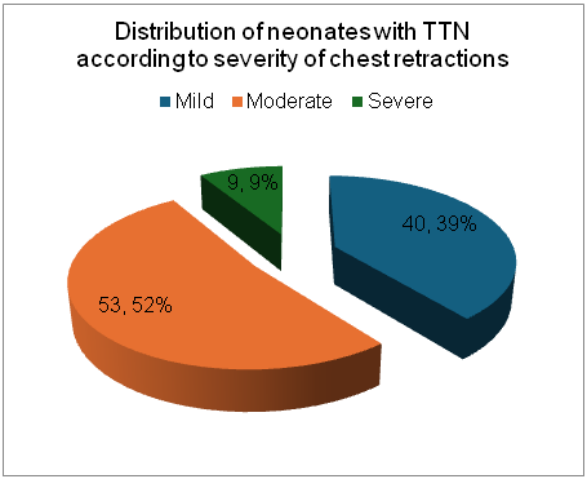

Figure 7: Distribution of neonates with TTN according to severity of chest retractions

It was observed that out of 102 neonates admitted in NICU with TTN, 40(39.2%) had mild chest retractions, 53(52%) had moderate and 9(8.8%) had severe chest retractions, as mentioned in Table 7 and severity of respiratory distress was evaluated according to it. Patients with mild and moderate chest retractions required less time to recover as compared with patients with severe chest retractions.

Table 8: Distribution of neonates with TTN according to Downe's score for assessment of respiratory distress in term neonates

		Neonates with TTN(n)	Neonates with TTN (n %)
Downes score in term neonates	<4	21	20.5
	4-7	24	23.5
	>7	4	3.9

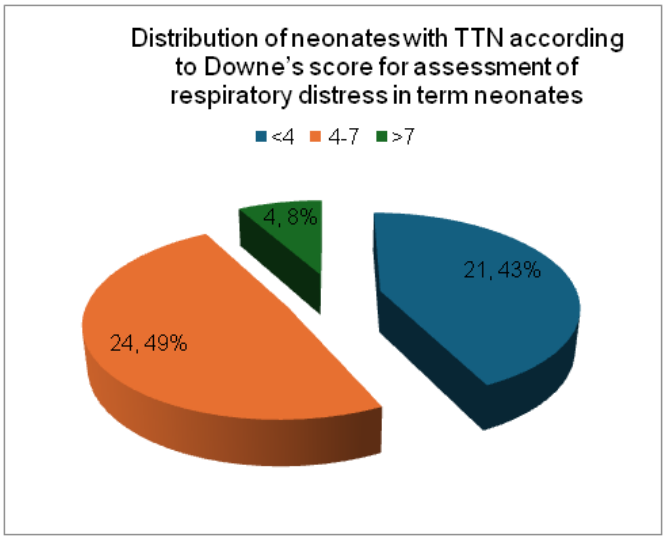

Figure 8: Distribution of neonates with TTN according to Downe's Score for assessment of respiratory distress in term neonates

Out of the 49 neonates with TTN born at term- Downe's score was <4 for 21(20.5%) i.e. mild respiratory distress, 4-7 for 24(23.5%) i.e. moderate respiratory distress and >7 for 4(3.9%) i.e. severe respiratory distress as mentioned in above Table 8.

Table 9: Distribution of neonates with TTN according to Silvermann Anderson score for assessment of respiratory distress in late preterm neonates

		Neonates with TTN(n)	Neonates with TTN (n %)
Silvermann Anderson Scoring in preterm neonates	0-3	14	13.7
	4-6	33	32.4
	>6	6	5.9
	Total	53	50.0

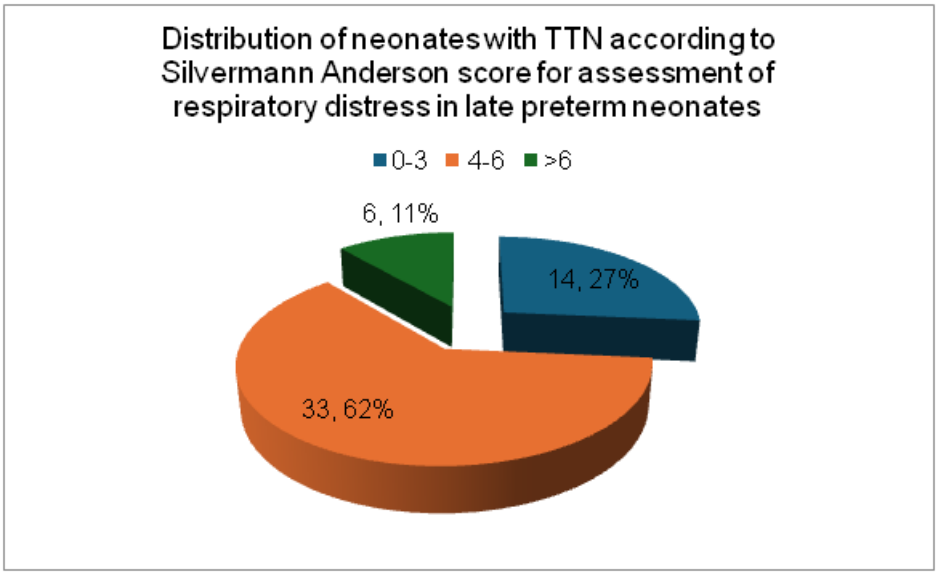

Figure 9: Distribution of neonates with TTN according to Silvermann Anderson score for assessment of respiratory distress in late preterm neonates

Out of the 53 neonates with TTN born at late preterm- Silvermann Anderson score was 0-3 for 14(13.7%) i.e. mild respiratory distress, 4-6 for 33(32.4%) i.e. moderate respiratory distress and >6 for 6(5.9%) i.e. severe respiratory distress as shown in Table 9.

Table 10: Distribution of patients according to born in mothers with multiple gestation or not

Multiple gestations	Neonates with TTN(n)	Neonates with TTN (n %)
No	47	46.1
Yes	55	53.9
Total	102	100.0

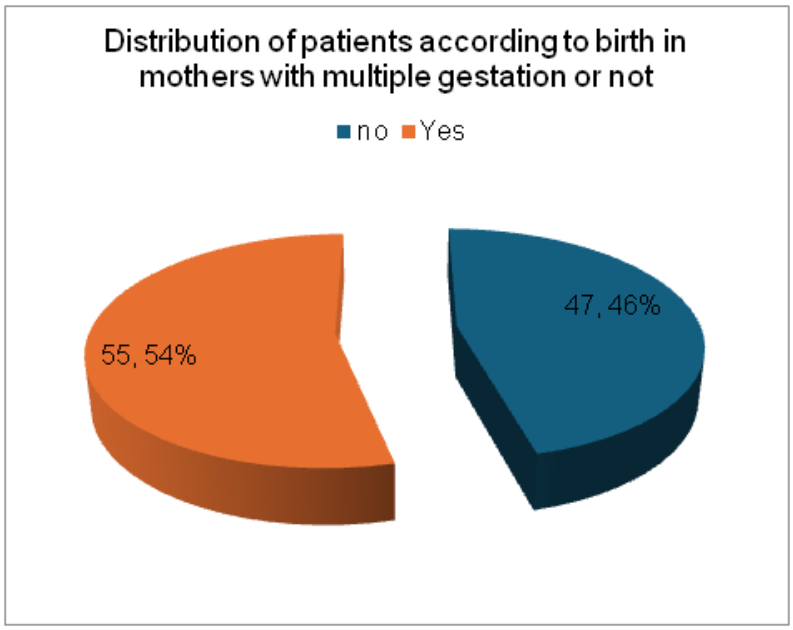

Figure 10: Distribution of patients according to born in mothers with multiple gestation or not

Out of 102 neonates in our study, 55(53.9%) were born from mothers with multiple gestation and 47(46.1%) were primigravida as shown in Table 10.

Table 11: Distribution of neonates with TTN born to mothers with gestational diabetes mellitus

Maternal diabetes	Neonates with TTN(n)	Neonates with TTN (n %)
No	91	89.2
Yes	11	10.8
Total	102	100.0

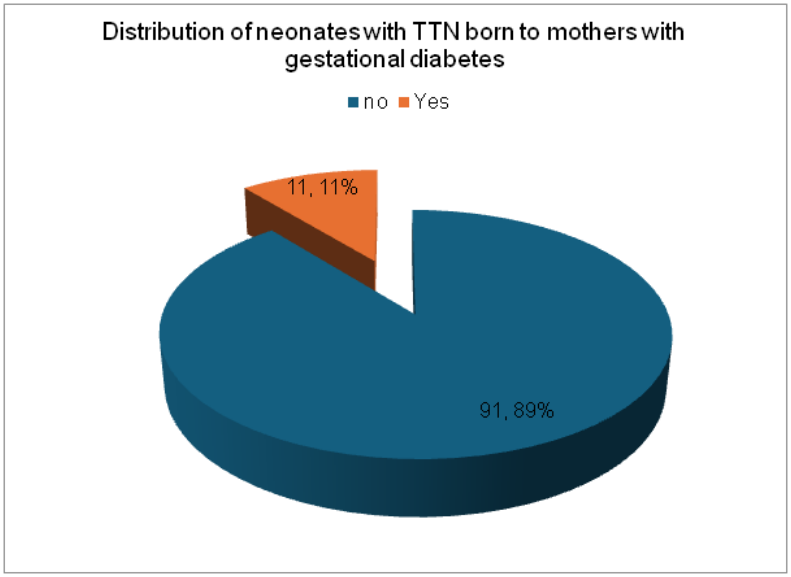

Figure 11: Distribution of neonates with TTN born to mothers with gestational diabetes mellitus

Out of 102 neonates in our study 11(10.8%) were born to mothers with gestational diabetes and 91(89.2%) were not and thus, gestational diabetes mellitus was found as a risk factor for TTN as shown in Table 11.

Table 12: Distribution of neonates with TTN born to mothers with hypothyroidism

Hypothyroidism	Neonates with TTN(n)	Neonates with TTN (n %)
No	94	92.2
Yes	8	7.8
Total	102	100.0

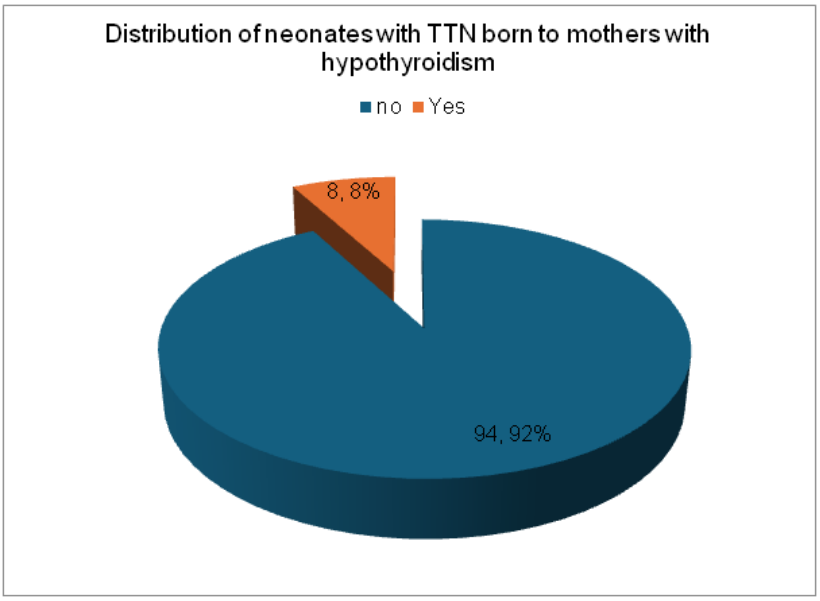

Figure 12: Distribution of neonates with TTN born to mothers with Hypothyroidism

Out of the 102 neonates in our study 8(7.8%) were born to mothers with hypothyroidism and it was an associated risk factor for TTN development as shown in Table 12.

Table 13: Distribution of neonates with TTN born to mothers with anemia

Anemia	Neonates with TTN(n)	Neonates with TTN (n %)
No	86	84.3
Yes	16	15.7
Total	102	100.0

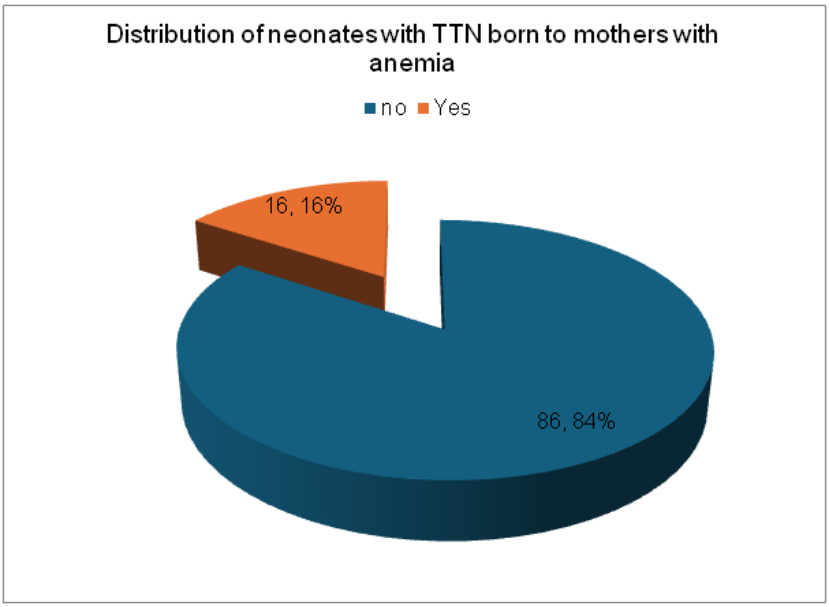

Figure 13: Distribution of neonates with TTN born to mothers with anaemia

Out of the 102 neonates in our study anaemiawas found as a risk factorand16 (15.7%) were born to mothers with anaemia, as shown in Table 13.

Table 14: Distribution of neonates with TTN born to mothers with Pregnancy induced hypertension

Hypertension	Neonates with TTN(n)	Neonates with TTN (n %)
No	85	83.3
Yes	17	16.7
Total	102	100.0

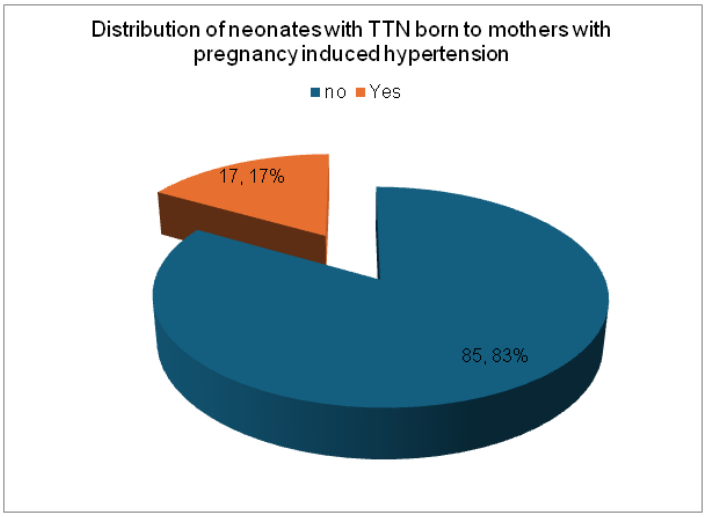

Figure 14: Distribution of neonates with TTN born to mothers with Pregnancy Induced hypertension

Out of the 102 neonates with TTN in our study 17(16.7%) were born to mothers with pregnancy induced hypertension as shown in Table 14.

Table 15: Distribution of neonates with TTN born to mothers with Asthma

Asthma	Neonates with TTN(n)	Neonates with TTN (n %)
No	87	85.3
Yes	15	14.7
Total	102	100.0

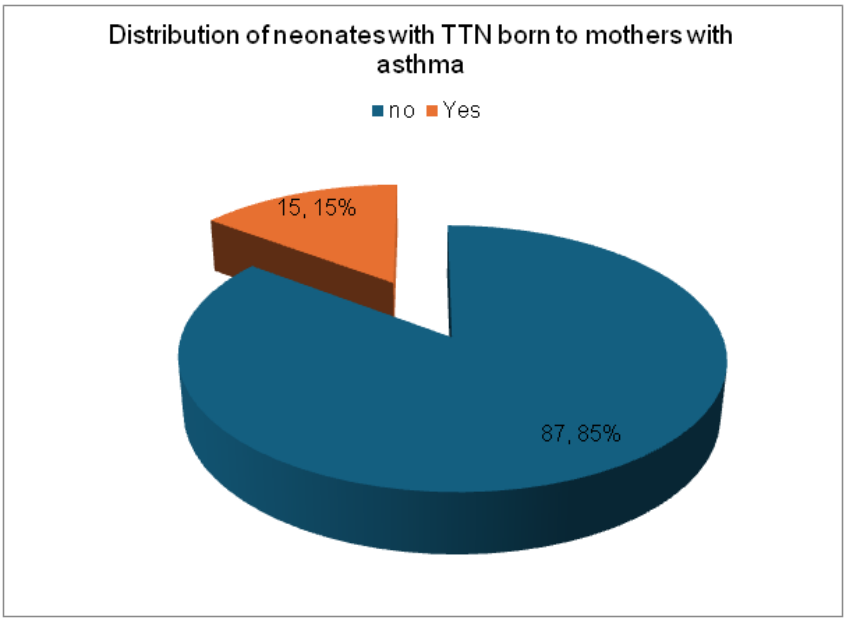

Figure 15: Distribution of neonates with TTN born to mothers with Asthma

Out of the 102 neonates with TTN in our study 15(14.7%) were born to mothers who had asthma, as shown in Table 15.

Table 16: Distribution of patients according to oxygen requirement in patients based on gender

Gender	Oxygen requirement						Total
	<24 hrs		24-48 hrs		>48 hrs		
	N	%	N	%	N	%	
Male	26	39.4	24	36.4	16	24.2	66
Female	16	44.4	10	27.8	10	27.8	36
Total	42	41.2	34	33.3	26	25.5	102

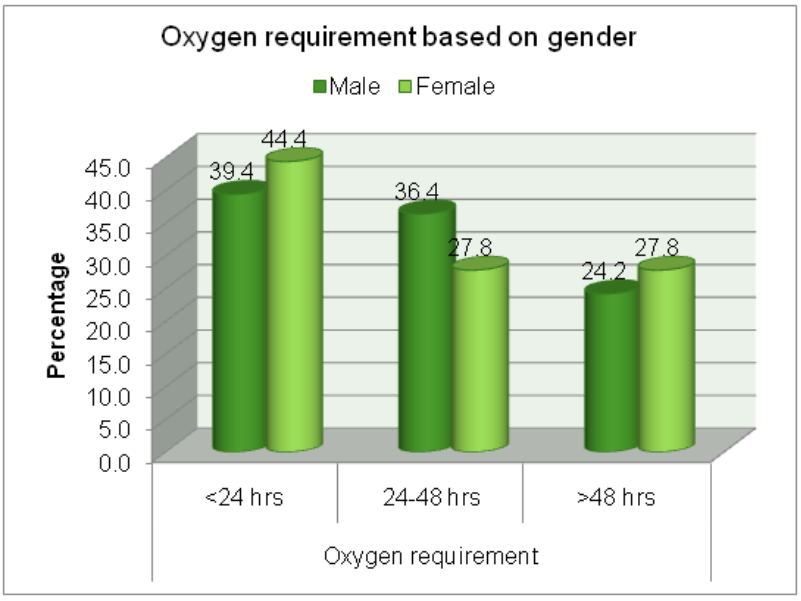

Figure 16: Oxygen requirement of patients based on gender

In our study the incidence of TTN according to gender was studied. Out of 66 male babies,26(39.3%)required oxygen for <24 hrs and out of 36 female babies 16(44.4%) required oxygen for<24 hrs. It was interpreted that the number of males with TTN were more who required oxygen than females. p value studied was 0.7 which is not significant as shown in Table 16.

Table 17: Distribution according to oxygen requirement in patients based on mode of delivery

Mode of delivery	Oxygen requirement						Total
	<24 hrs		24-48 hrs		>48 hrs		
	N	%	N	%	N	%	
Vaginal delivery	8	34.8	12	52.2	3	13	23
LSCS	34	43	22	27.8	23	29.1	79
Total	42	41.2	34	33.3	26	25.5	102

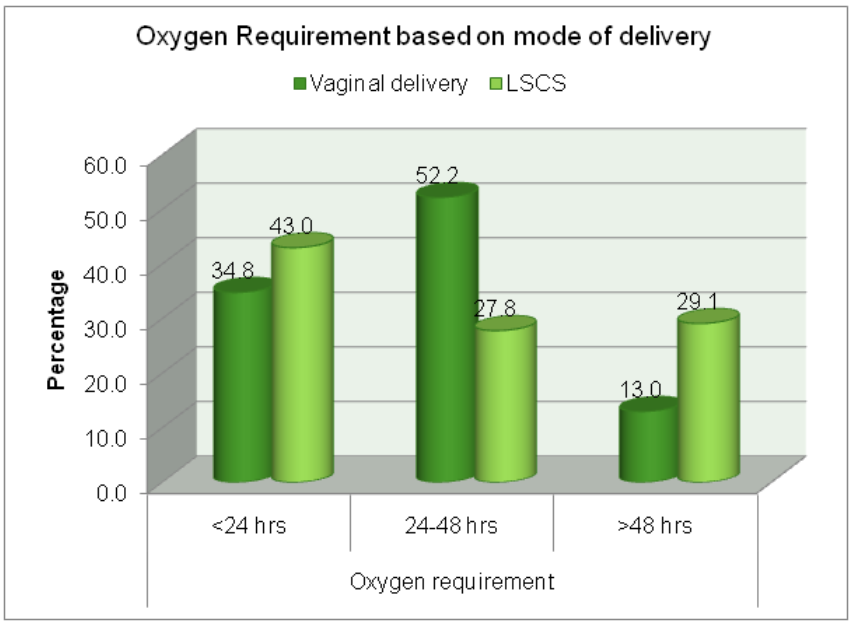

Figure 17: Distribution of patients according to oxygen requirement based on mode of delivery

In our study 23(29.1%) neonates born via LSCS required oxygen >48 hrs and 3(13%) neonates born via Vaginal delivery required oxygen >48 hrs. p value was 0.07 which is not significant calculated using Chi Square Test as shown in Table 17.

Table 18: Distribution according to oxygen requirement based on babies born to mothers with multiple gestation

Multiple gestation	Oxygen requirement						Total
	<24 hrs		24-48 hrs		>48 hrs		
	N	%	N	%	N	%	
Primigravida	21	44.7	15	31.9	11	23.4	47
Multigravida	21	38.2	19	34.5	15	27.3	55
Total	42	41.2	34	33.3	26	25.5	102

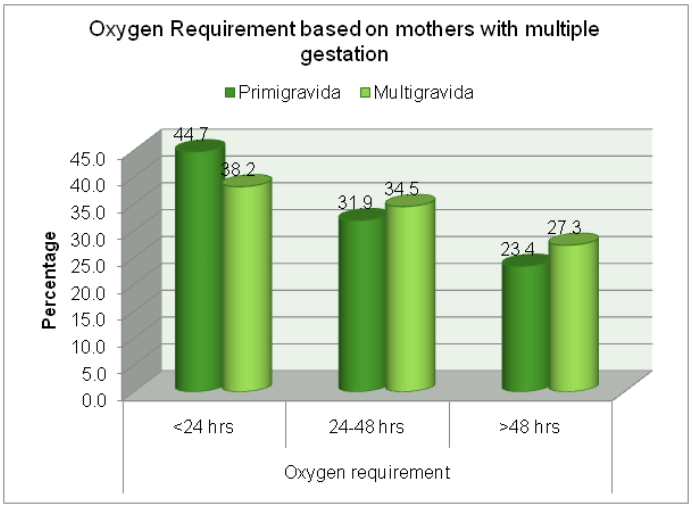

Figure 18: Distribution of patients according to oxygen requirement based on mothers with multiplegestations

In our study oxygen requirement was >48 hrs in 15(27.3%) babies born to multigravida mothers. P value was 0.7 calculated using Chi Square Test which was not significant as shown in Table 18.

Table 19: Distribution of patients according to oxygen requirement based on babies born to mothers with gestational diabetes

Gestational diabetes	Oxygen requirement						Total
	<24 hrs		24-48 hrs		>48 hrs		
	N	%	N	%	N	%	
No	38	41.8	31	34.1	22	24.2	91
Yes	4	36.4	3	27.3	4	36.4	11
Total	42	41.2	34	33.3	26	25.5	102

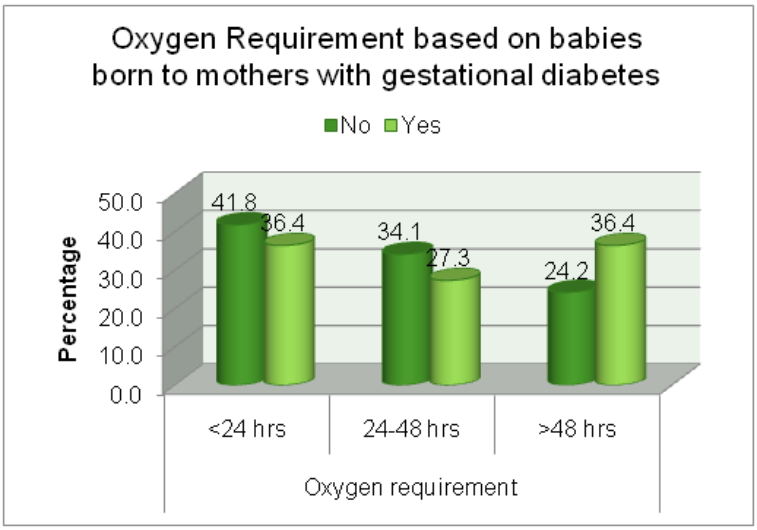

Figure 19: Distribution of patients according to oxygen requirement based on babies born to mothers with gestational diabetes mellitus

In our study, 4(36.4%) babies born to mothers with gestational diabetes, and 22(24.2%) babies born to mothers who did not have diabetes required oxygen for more than 48 hrs. P value was 0.678 which was not significant, calculated using Chi Square test as shown in Table 19.

Table 20: Distribution of patients according to oxygen requirement based on babies born to mothers with hypothyroidism

Hypothyroidism	Oxygen requirement						Total
	<24 hrs		24-48 hrs		>48 hrs		
	N	%	N	%	N	%	
No	39	41.5	32	34	23	24.5	9
Yes	3	37.5	2	25	3	37.5	8
Total	42	41.2	34	33.3	26	25.5	102

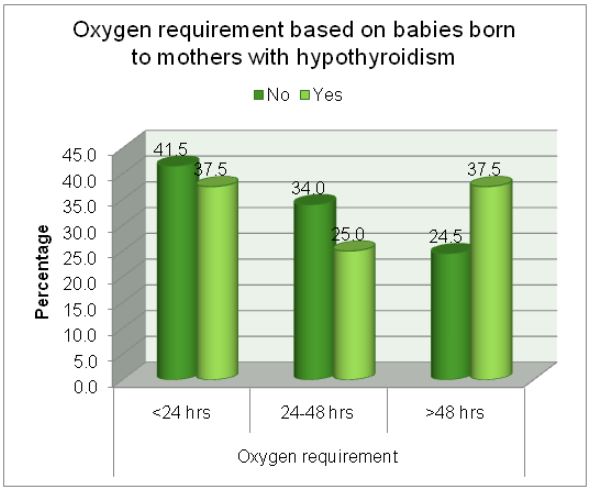

Figure 20: Distribution of patients according to oxygen requirement in babies born to mothers with Hypothyroidism

In our study, 3(37.5%) babies born to mothers with hypothyroidism, and 23(24.5%) babies born to mothers who did not have hypothyroidism required oxygen for more than 48 hrs. P value was 0.704 which was not significant, calculated using Chi Square test as shown in Table 20.

Table 21: Distribution of patients according to oxygen requirement based on babies born to mothers with anaemia

Anemia	Oxygen requirement						Total
	<24 hrs		24-48 hrs		>48 hrs		
	N	%	N	%	N	%	
No	34	39.5	30	34.9	22	25.6	86
Yes	8	50.0	4	25	4	25	16
Total	42	41.2	34	33.3	26	25.5	102

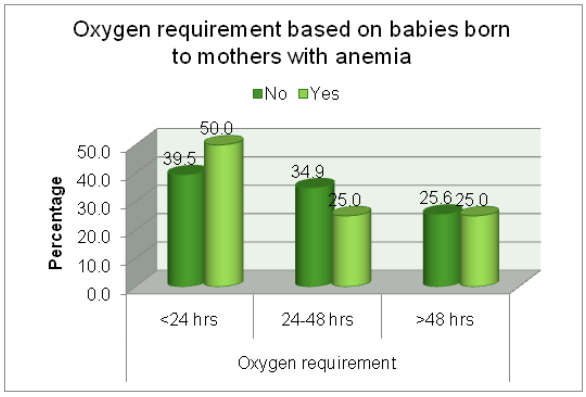

Figure 21: Distribution of patients according to oxygen requirement of babies born to mothers with anaemia

In our study, 4(25%) babies born to mothers with anaemia, and 22(25.6%) babies born to mothers who did not have asthma required oxygen for more than 48 hrs. P value was 0.685 which was not significant, calculated using Chi Square test as shown above in Table 21.

Table 22: Distribution of patients according to oxygen requirement based on babies born to mothers with pregnancy induced hypertension

Hypertension	Oxygen requirement						Total
	<24 hrs		24-48 hrs		>48 hrs		
	N	%	N	%	N	%	
No	34	40.0	28	32.9	23	27.1	85
Yes	8	47.1	6	35.3	3	26	17
Total	42	41.2	34	33.3	26	25.5	102

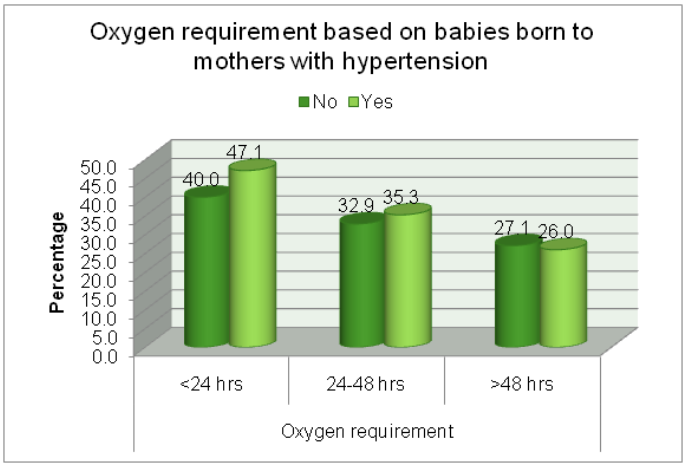

Figure 22: Distribution of patients according to oxygen requirement of babies born to mothers with pregnancy induced hypertension

In our study, 3(17.6%) babies born to mothers with hypertension, and 23(27.1%) babies born to mothers who did not have hypertension required oxygen for more than 48 hrs. P value was 0.709 which was not significant, calculated using Chi Square test as shown above in Table 22.

Table 23: Distribution of patients according to oxygen requirement of babies born to mothers with asthma

Asthma	Oxygen requirement						Total
	<24 hrs		24-48 hrs		>48 hrs		
	N	%	N	%	N	%	
No	37	42.5	28	32.2	22	25.3	85
Yes	5	33.3	6	40.0	4	26.7	17
Total	42	41.2	34	33.3	26	25.5	102

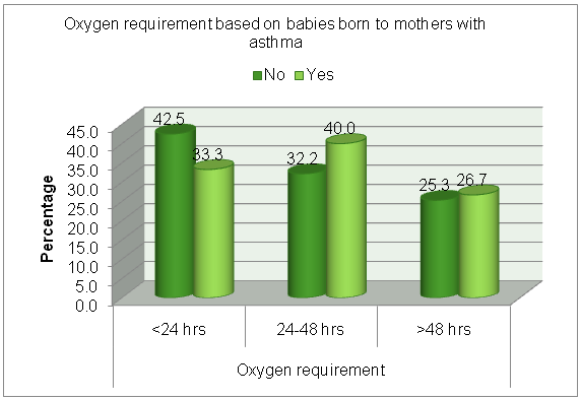

Figure 23: Distribution of patients according to oxygen requirement of babies with TTN born to mothers with asthma

In our study, 4(26.7%) babies born to mothers with asthma, and 22(25.3%) babies born to mothers who did not have asthma required oxygen for more than 48 hrs. P value was 0.776 which was not significant, calculated using Chi Square test as shown in Table 23.

Table 24: Distribution of data according to outcome of duration of stay in hospital in relation to Downe's Score

Downes score	Duration of hospital stay (in days)				Total
	<=3		>3		
	N	%	N	%	
<4	16	73.9	6	26.1	22
4-7	13	58.3	10	41.7	23
>7	1	25	3	75	4
Total	30	62.7	19	37.3	49

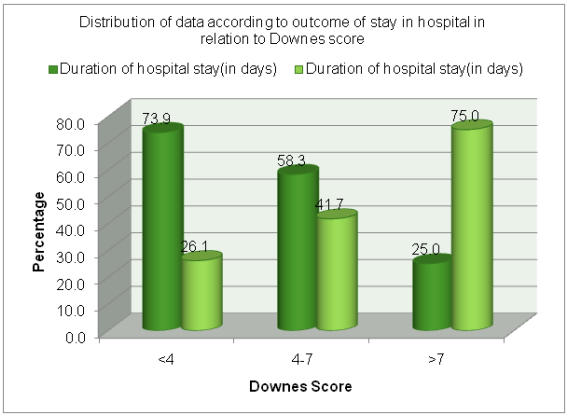

Figure 24: Distribution of patients according to duration of stay in hospital in relation to Downe's Score

Out of the 49 neonates with in which Downe's Score was calculated, 30(62.7%) of them had hospital stay for less than 3 days and 19(37.3%) babies more than 3 days. P value was 0.145, which was not significant, calculated using Chi Square test as shown in above Table 24.

Table 25: Distribution of data according to outcome of duration of stay in hospital in relation to Silvermann Anderson Score

Silvermann Anderson score	Duration of hospital stay (in days)				Total
	<=3		>3		
	N	%	N	%	
0-3	12	84.6	3	15.4	15
4-6	16	50.0	16	50.0	32
>6	1	16.7	5	83.3	6
Total	29	54.9	24	45.1	53

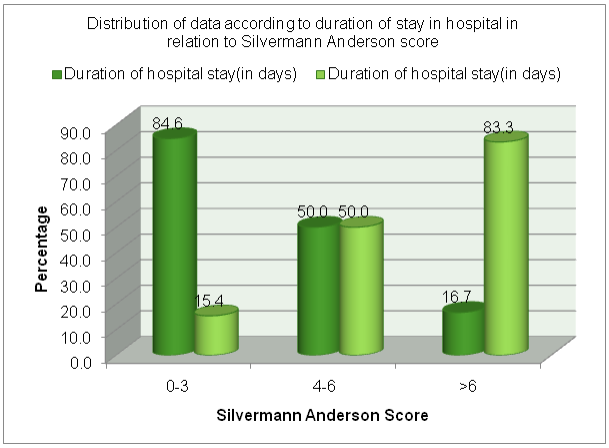

Figure 25: Distribution of patients according to duration of stay in hospital in relation to Silvermann Anderson score

Out of the 53 neonates within which Silvermann Anderson Score was calculated 29(54.9%) of them had hospital for less than 3 days and 24(45.1%) had hospital stay for more than 3 days. P value was 0.014, which was significant, calculated using Chi Square test as shown in Table 25.

Table 26: Distribution of data according to outcome of patients discharged, LAMA or Death

	Neonates with TTN(n)	Neonates with TTN (n %)
Discharge	96	94.1
LAMA	6	5.9
Death	0	0
Total	102	100

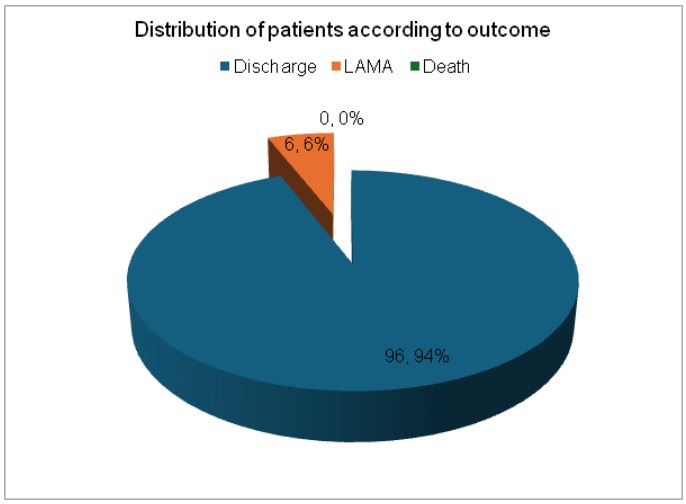

Figure 26: Distribution of data according to outcome of patients Discharged, LAMA, or Death

In our study, out of 102 cases of TTN 96 (94.1%) were discharged and 6 (5.9%) of them went LAMA. There was no death which indicated good prognosis of neonates with TTN as shown in Table 26.

Discussion

Transient Tachypnea of Newborn is one of the most common causes of respiratory distress in a newborn.

Neonatal risk factors

Gender: There were 66 males (64.7%) who outnumbered 36 females (35.3%) admitted for TTN in NICU. This shows clear gender bias towards males. In our study Male: Female ratio was 1.8:1, as shown in Table 1 mentioned above. Our finding was comparable to study done in Sudan by Abdelmoneim E.M. Kheir et al in which male to female ratio for incidence of TTN was 2.2:1.[9]

Mode of delivery

It was observed in our study, newborn delivered via caesarean delivery 79 (77.5%) had greater incidence of TTN than newborns born via Vaginal delivery 23 (22.5%), as shown in Table 2.

This finding is similar to the study done in Turkey by Zuhal Gundogdu et al. Similar association between Cesarean section and incidence of TTN was found in a study conducted by Sanjay Chavan et al in Pune where mean duration of tachypnea in LSCS group was 32.4 hrs and in vaginal delivery group was 26.2 hrs.[10]

Maternal risk factors

Association with parity: TTN was more common in multiparous females 55(53.9%) as compared to nulliparous females 47(46.1%). This finding was not similar to the findings in study conducted by Sanjay Chavan et al. In their study the association between parity and TTN was not established[6]. Takaya et al. reported that nulliparity was a risk factor for the development of TTN, but there was no association between parity and TTN was found in their study. Prematurity has been associated as risk factor for TTN [11-13].

Gestational diabetes mellitus

In the present study maternal diabetes was found as a risk factor for TTN. A total of 11(10.8%) neonates with TTN were born to mothers with diabetes, as shown in Table 11.

Our finding was similar to a study conducted in Sudan by Kheir et al. It was observed that TTN was two-three times more common in females with diabetes mellitus which could be due to morbidities associated with infants of diabetic mothers, commonly macrosomia which is associated with increased rate of Cesarian section and thus TTN development. [9]

Asthma: In the present study asthma was studied as a risk factor and it was found that 15(14.7%) neonates who had TTN were born to asthmatic mothers as shown above in Table 15**.** In a study conducted by Demissie et al, 18.2% of the mothers had asthma. They found that infants of mothers with asthma were more likely to exhibit TTN than infants of mothers in the control group.[14]

Gestational diabetes mellitus and maternal asthma are well-established risk factors for the development of TTN. Kumari S et al. (2012) found that maternal hypertension, diabetes mellitus, and the absence of labor were independent risk factors for respiratory morbidity in neonates [6]

Pregnancy induced hypertension: In our study pregnancy induced hypertension was significantly associated with TTN. 17(16.7%) out of 102 neonates with TTN were born to mothers with PIH, as shown in Table 14**.** This was similar to a study conducted by Badran et al, where they stated that maternal hypertension may lead to increased risk of TTN. In their study, incidence rate of TTN was 1.85 times higher in patients with PIH, (95% CI ¼ 1.69e2.03, p < 0.0001) compared with those in the matched control cohort. It was believed that abnormal placental products, such as pro-BNP, OS, and ROS, which are induced by PIH, could exist in the fetal circulatory system and may be involved in the pathogenesis of TTN.[15]

Others

Respiratory distress scoring: In the present study we conducted a scoring system for assessment of respiratory distress in relation to the gestational age of newborns. For newborns born at term Downe's score was used, which was divided into <4 for mild distress it was found in 21(20.5%) of the neonates, moderate score 4-7 found in 24(23.5%) neonates and severe respiratory distress >7,found in 4(3.9%) of the neonates, table 8.Silvermann scoring was done for assessment of severity of respiratory distress in late preterm neonates.14 of the babies (13.7%)had mild respiratory distress i.e. score 0-3, 33(32.4%) had moderated respiratory distress i.e. score 4-6, 6 babies (5.9%) had severe respiratory distress i.e., score >6, Table 9.

Oxygen requirement: In our study, of the 102 neonates with TTN, requirement of oxygen support was studied and compared.

As to whether neonates required oxygen <24 hrs; 24-48 hrs or for >48 hrs. It was compared with various risk factors and was found to be associated with severity of respiratory distress. Oxygen requirement was studied across various risk factors associated with TTN as shown above in Table 16-23.

Outcome: In our study outcome was calculated based on discharge under stable condition; LAMA; or death of the patients. It was found that patients with TTN fully recovered and had excellent prognosis, out of the 102 neonates, 96(94.1%) were discharged under stable condition. 6(5.9%) went LAMA due to personal reasons of the patient's attendant; no death was observed during their hospital stay, as shown in Table 26.

In a study conducted by Erin et al.**,** it was concluded that babies with TTN when given adequate monitoring and treatment in the hospital, they usually recovered fully. Most babies gradually recovered within 24 - 48 hours after delivery. Babies who had transient tachypnea did not have any further problems from the condition, and did not need special care or follow-up other than their routine paediatrician visits.

Conclusion

From the present study we conclude that, transient Tachypnea of Newborn is one of the most common causes of respiratory distress in newborn. It is a self-limiting disorder and usually resolves within 12-72 hours. It is characterised by tachypnea (respiratory rate >60 breaths/min), signs of mild respiratory distress i.e., chest retractions, cyanosis and grunting. In our study incidence of TTN patients admitted in our hospital was calculated. Various risk factors associated with TTN were studied. It was seen that TTN was more common in newborns born via caesarean section, in male newborns, late preterm and term birth, babies born to mothers with gestational diabetes mellitus, hypothyroidism, asthma and pregnancy induced hypertension.

Upon studying the outcome, we found that TTN usually resolved within 12-72 hours, rarely persisting beyond 72 hours. FiO_2 required was <0.40 in most of the neonates with TTN. All neonates were discharged in stable condition with excellent prognosis.

Good antenatal, intra-natal and perinatal care can bring down the incidence of TTN and reduce the morbidity and mortality in the neonates.

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