



**PREVALENCE, RISK FACTORS AND SHORT TERM OUTCOME OF INFANTS WITH
TRANSIENT TACHYPNEA OF THE NEWBORN IN SUDAN**

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ABSTRACT

Background: Transient tachypnea of the newborn is the most important respiratory problems in the neonatal period. **Materials and methods:** This was a descriptive, hospital based study that was conducted in the NICU of Omdurman maternity hospital. 170 newborns who fulfilled the inclusion criteria were included in the study. Data was collected using a structured questionnaire and was analyzed using SPSS program version 20. Frequency tables and graphs were used to present data. **Results:** The main result revealed that transient tachypnea of the newborn constituted 1.67% of all hospital deliveries, Identifiable risk factors included multiparity, maternal diabetes mellitus, maternal asthma and delivery by caesarean section. Additional risk factors included male sex and lower gestational age. The overall prognosis for transient tachypnea of the newborn was good with eventual recovery in all babies. **Conclusion:** Measures to reduce unnecessary caesarean sections should be implemented to reduce the risk of TTN.

KEYWORDS: Transient tachypnea of the newborn; respiratory distress; Caesarean section; neonates; Sudan.

INTRODUCTION

Transient tachypnea of the newborn (TTN) is a respiratory disorder resulting from inadequate or delayed clearance of foetal lung fluid and is commonly seen in full-term or late-preterm infants.^[1,2] There are limited data regarding the epidemiology of TTN, but studies show that TTN occurs in 3.6 to 5.7 per 1,000 term infants.^[3,4] Risk factors for TTN include birth by cesarean section (CS) with or without labor, male sex, family history of asthma, lower gestational age, macrosomia, and maternal diabetes.^[5]

Clinical symptoms include tachypnea, expiratory grunting, nasal flaring, and retraction upon or immediately after birth. These symptoms usually resolve naturally within 48-72 hours after birth, but can last up to 5 days. The diagnosis of TTN is based on clinical and radiologic findings but frequently it is a diagnosis of exclusion.^[6]

The condition is generally self-limiting and benign and frequently improves within 2 days. However, TTN can cause respiratory failure in some cases.^[7] In a retrospective review of 95 newborns who had TTN, clinical and laboratory findings were compared between two subsets: babies in whom tachypnea lasted fewer than 72 hours and those in whom it lasted more than 72 hours. The authors suggested that a peak respiratory rate of

more than 90 breaths/minute at 36 hours of age was highly predictive of prolonged tachypnea. Prolonged TTN was associated with lower white blood cell count and haematocrit values, longer hospitalization, and antibiotic treatment in this study.^[8]

TTN presents an important diagnostic and therapeutic dilemma in the neonatal intensive care unit (NICU). There are few published studies in developing countries addressing neonatal respiratory distress. Abdelrahman et al reported that the prevalence of neonatal respiratory distress among the total number of hospital live births was 4.83% and TTN constituted 28% of all cases.^[9] The main objectives of this study were to study the prevalence of TTN in neonates admitted to Omdurman maternity hospital, also to look for possible risk factors and short term outcome for babies admitted with TTN.

MATERIALS AND METHODS

This was a prospective, descriptive, hospital based study that was conducted in the NICU of Omdurman maternity hospital which is the main tertiary referral center for that district of the country. The study was conducted during the period February 2014 to July 2014. 170 newborns who fulfilled the inclusion criteria were included in the study. All neonates who were delivered vaginally or by caesarean section at term and required admission to NICU due to respiratory distress with a presumptive

diagnosis of TTN were included, those who were excluded from the study were babies less than 37 weeks gestation, babies with major congenital anomalies, those with complicated delivery like instrumental delivery and neonates with respiratory distress with a diagnosis other than TTN, e.g. Meconium aspiration, etc.

In this study we were interested in 170 babies who were born by 167 mothers, as 3 of these mothers were pregnant with twins who were admitted with TTN. Statistically we put the mothers in a cumulative frequency table, so that the total number of mothers will be 170 the same as the babies.

The diagnosis of TTN was made based on history, clinical presentation, radiology when applicable and after exclusion of all other causes of respiratory distress. The prevalence, risk factors and outcome of transient tachypnea of the newborn were studied. Data were collected using a structured questionnaire including: patient's identification, history, risk factors, clinical presentation, investigations if any, treatment received and outcomes. Data were analyzed using Statistical Package for Social Sciences (SPSS) program version 20. Frequency tables and graphs were used to present data.

Ethical approval for conducting this research was granted by the ethical committee of Sudan medical specialization board. Prior informed consent was obtained from individual subjects with full explanation of the study.

RESULTS

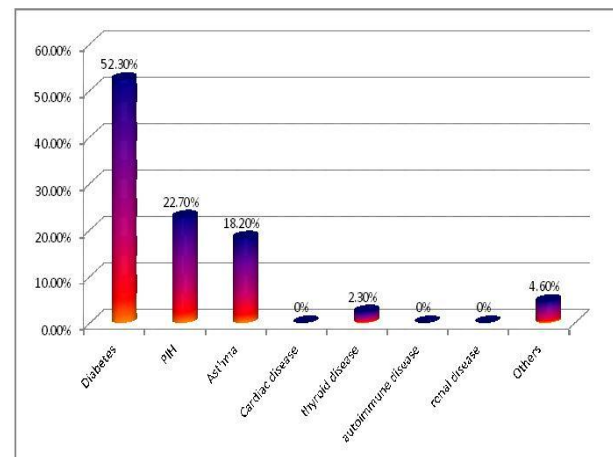
During the study period a total of 170 babies who fulfilled the criteria were included in the study.

The total number of hospital deliveries was 10172 live newborns during the study period, TTN constituted 1.67% of all hospital deliveries. Those who were admitted with respiratory distress were 35.85% and out of which TTN constituted 32.01% of those admitted with respiratory distress.

Regarding maternal age, 139(81.8%) of the mothers were between 18-35 years, 24(14.1%) were more than 35 years and 7(4.1%) were less than 18 years.

21.17% of the mothers were primigravida and 161(94.7%) were fertile, 9(5.3%) had history of infertility. Out of the 170 mothers included in this study, 105(61.8%) were on regular antenatal care, 44(25.9%) were on irregular antenatal care and 21(12.4%) had no antenatal care. 44(25.9%) of the mothers participated in the study had medical problems during pregnancy. 23(52.3%) had diabetes mellitus, 10(22.7%) had pregnancy induced hypertension, 8(18.2%) had asthma, 1(2.3%) had thyroid disease, 2(4.6%) had other diseases in form of deep vein thrombosis and chronic cough for investigation. None of the mothers had cardiac, autoimmune or renal disease Figure (1).

Figure (1) Medical problems during pregnancy among the study group

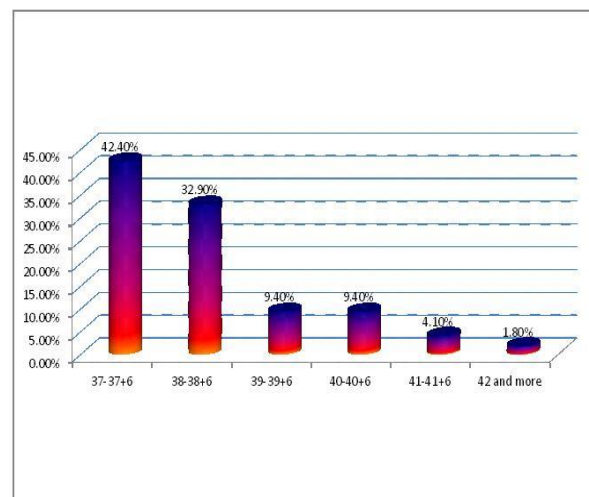


PIH: Pregnancy induced hypertension

The majority of deliveries (75.3%) were by CS, out of which, 68.7% were elective CS and 31.3% were emergency CS.

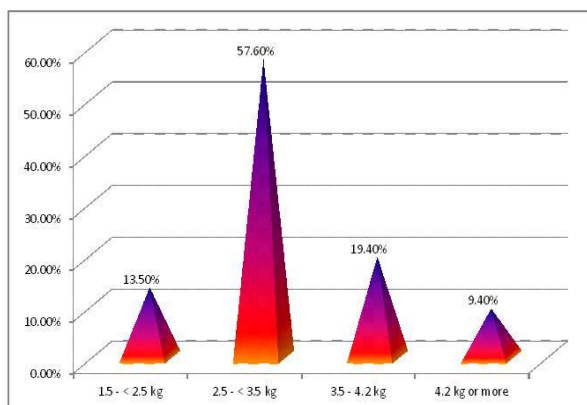
Regarding neonatal data, Male: female ratio was 2.2:1. The study revealed that 72(42.4%) were between 37-37+6 weeks, 56(32.9%) between 38-38+6 weeks, 16(9.4%) between 39-39+6 weeks and 40-40+6 weeks, 7(4.1%) neonates were between 41-41+6 weeks and the least category 3(1.8%) was at the gestational age of 42 weeks and more. Figure (2)

Figure (2): Distribution of the study group according to gestational age



Only 5.3% of the study group had Apgar score less than 7 at 5 minutes and 7.6% needed some form of resuscitation at birth. More than half of the study group (57.6%) had birth weight between 2.5 - < 3.5 kg, 19.4% between 3.5 - < 4.2 kg, 13.5% had low birth weight of less than 2.5 kg and 9.4% of the babies had birth weight of 4.2 kg and more. Figure (3)

Figure (3) birth weight among the study group



Regarding duration of admission, about one third of the neonates stayed more than 72 hours in NICU 57(33.5%), 44(25.9%) stayed between 24-<72 hours, 37(21.8%) stayed only 1-4 hours and the least category stayed between 4 - <24 hours 32(18.8%). Regarding treatment received, all neonates included in the study received oxygen, 124(72.9%) received intravenous fluids in addition to oxygen. 101(64.7) received antibiotics in addition to oxygen. All neonates included in the study were discharged in good condition with no mortality.

DISCUSSION

TTN, one of the most important respiratory problems in the early neonatal period that occurs at high frequency worldwide and was first described by Avery in 1966.^[10] The present data showed that the prevalence of TTN was 1.67% of all hospital deliveries, this is similar to a study done in Turkey that showed prevalence of 1%.^[11] A higher prevalence rate of 2.9% was reported from Jordan^[12], this could be due to differences in local policies regarding hospital admission.

Most of the mothers in our study were multiparous, this finding is consistent with the Turkish study which revealed that multiparity increases the complexity of respiratory problems for reasons that remain unclear.^[11] It has been found that both the respiratory counts of TTN cases delivered by multiparous mothers and tachypnea durations in such cases were significantly greater than those of singly born TTN infants.

The present study showed that almost all the mothers were fertile which is contrary to the Japanese study which showed that the incidence of TTN was significantly associated with infertility (P value <0.001)^[13], this high incidence may be due to the fact that, these were precious babies and were delivered by CS that increased the risk of TTN.

61.8% of the mothers were on regular antenatal care, this is closely similar to a study done in Sudan that showed

65% of mothers of neonates who had respiratory distress were on regular antenatal care.^[9] Maternal history is an important factor in diagnosing TTN, so regular antenatal care and maternal follow up may help to predict development of TTN. More than half of the mothers with disease in pregnancy, had diabetes mellitus, which is similar to a previous study that revealed TTN occurred two to three times more commonly in infants of diabetic mothers.^[14] The major morbidities associated with infants of diabetic mothers include, macrosomia; which is the greatest complication that has been associated with an increased rate of CS and subsequent TTN development.^[15]

18.2% of the mothers in the present study had asthma, this was in agreement with a Mexican study which revealed that TTN was more frequent in cases of bronchial asthma^[16], although the mechanism is unknown. Demissie et al performed a historical cohort analysis on singleton live deliveries in New Jersey hospitals, they found that infants of mothers with asthma were more likely to exhibit TTN than infants of mothers in the control group.^[17] Our data indicated that about three quarters of the deliveries were by CS, this finding is in line with those in the literature, as cesarean section is the major risk factor for TTN worldwide.^[4,18]

The present study revealed that the male to female ratio was 2.2:1. Male (compared to female) gender is important in increasing the complexity of respiratory problems.^[19] Male fetuses develop lower catecholamine responses when subjected to asphyxia.^[20] Our data indicated that just less than half of the babies with TTN were born before 38 weeks gestation, about a third were born before 39 weeks and about 10% were born after 39 weeks, similar findings were reported in a previous study where lower gestational age was associated with more risk of TTN.^[21]

All neonates included in the study were discharged in good condition with no mortality which is consistent with the general trend as the overall prognosis for TTN is good with eventual recovery in most babies. The reported mortality rate with TTN for term babies is .8%.^[22]

CONCLUSION

TTN is the most important respiratory problems in the neonatal period. Identifiable risk factors included multiparity, maternal diabetes mellitus, maternal asthma and delivery by CS. Additional risk factors included male sex and lower gestational age. The overall prognosis for TTN was good with eventual recovery in all babies. Measures to reduce unnecessary CS should be implemented to reduce the risk of TTN.

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