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# Prevalence of Congenital Hypothyroidism; in Rural Area of District Gautam Budha Nagar (U.P.)

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## Abstract

**Introduction:-** Congenital hypothyroidism is a condition that affects the newborns and results from a partial or complete loss of thyroid function. Congenital hypothyroidism occurs when the thyroid gland fails to develop the thyroid hormone or do not function properly. In 80 to 85 percent of cases, the thyroid gland is absent, abnormally located, or severely reduced in size. In the remaining cases, a normal-sized or enlarged thyroid gland is present, but production of thyroid hormones is decreased or absent. If untreated, congenital hypothyroidism can lead to intellectual disability and abnormal growth. Iodine is an essential dietary element which is required for the synthesis of the thyroid hormones, thyroxine (T4) and tri-iodothyronine (T3). In endemic goiter areas, congenital hypothyroidism may occur due to iodine deficiency.

**Aim:-** To screen the Rural area's neonates for Congenital Hypothyroidism.

**Results:-** The prevalence of CH is 4/161 live birth observed in the rural area of Gautam Buddha Nagar District and it also observed that the mean level of TSH was higher in female compared to male neonates.

**Conclusion:-** Despite the overwhelming evidence of a high prevalence of CH in India, this imminently treatable cause for developmental delay and mental retardation continues to await a credible universal screening programme. To get the actual picture of CH in the study area is to need to screen more neonates, which helps to make the more precise evaluation of CH.

***Keywords:-*** *Thyroid stimulating hormone (TSH), Thyroxine, and congenital hypothyroidism (CH).*

## Introduction

Congenital hypothyroidism (CH) is the most common congenital endocrine disorder in neonates and also is one amongst the foremost common preventable causes of mental retardation. If the diagnose is confirmed, treatment is started within in a few weeks of life, the neurodevelopmental outcome is generally normal [1]. The clinical features of congenital hypothyroidism are typically delicate and many newborns remain undiagnosed at the time of birth [2]. This is often due to partly passage of maternal thyroid hormone secretion across the placenta providing a protective impact, particularly on the fetal brain and masking the clinical signs [3]. Even the foremost common type of CH has some moderately functioning residual thyroid gland creating clinical diagnosis difficult [4]. Within a few weeks of birth as hypothyroxinemia progresses clinical signs and symptoms of hypothyroidism become a lot of obvious and put neonatal brain in danger of irreversible injury. So it is necessary to start treatment as shortly as potential when birth. For all of the above reasons, screening has become the most effective way to detect infants with CH in many parts of the world. Pilot screening programs for CH were developed in Quebec and Canada in 1974 and have currently been established in Western Europe, North America, Japan, Australia and parts of Eastern Europe, Asia, South America and Central America [5,6]. In North America, over 5 million newborns are screened

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and around 1400 neonates with CH are detected annually. The newborn screening program in India is still in its early stages because of poor infrastructure and economic suppression. In some of the countries like the UK, T4 is measured to rule out the CH and followed by TSH when T4 is low. Some projects measure TSH as the primary screen [7]. In the present study, we have embraced both analytes T4 (free) and TSH to screen the newborns. The worldwide incidence of maternal hypothyroidism in gestation is overt (0.3 to 0.5 %) or subclinical hypothyroidism (2 to 3%). The chronic autoimmune thyroiditis is the most common reason behind maternal hypothyroidism in iodine sufficient areas. In view of these facts we have not included these type of patients who are having maternal history of thyroid or on anti-thyroid treatment because due to permanent administration of medicine may additionally affect the fetus, other causes are previously treated graves, thyroid cancer, drug and external radiation-induced hypothyroidism and pituitary dysfunctions, associated Injurious to fetus and neonatal outcome include preterm birth, intrauterine growth restriction (IUGR), congenital anomalies, fetal distress in labor and fetal leads to parental deaths. However, these complications are avoided with adequate treatment of hypothyroidism ideally in early gestation. The affected fetus may experience neurodevelopment impairments, significantly if both the fetus and the mother are hypothyroid during the gestational period [8].

## Material and Method

The multi-centric hospital-based study was conducted over a period of 2 years from 2014 to 2016. Total one hundred and sixty-one neonates screened for congenital hypothyroidism from the rural area of Gautam Buddha Nagar district. Out of the total 36 healthy neonate subjects used as a control and rest 125 neonates used as the study patients. Ethical approval was taken from the Institutional Ethical Committee. All mothers of neonates were healthy and none experienced complications within the pregnancy or delivery. The neonates delivered at the hospital in the stipulated time period were included. All neonates underwent free T4 and TSH measurements to screen for congenital hypothyroidism. 3ml blood was collected by a trained staff nurse or pediatrician in a plain tube and centrifuged at 4500 RPM for 15 minutes. The TSH concentration > 25 μ IU/ml in the cord blood and TSH concentration > 10 μ IU/ml in the venous blood on initial screening sample were considered to have positive screening result. Any abnormal values were rechecked or repeated within 3 days. Patients were followed up till discharge and further follow up was done in those cases with congenital hypothyroidism.

**Results:-** Total 161 neonates screened for CH from the rural area of Gautam Buddha Nagar District in which 55.9% neonates were male and 44.10% female with the male to female ratio 1.26:1. The maternal age ranges from 20-45 years. All the cases were full term, no premature baby included in the present study.

The descriptive data are given as mean ± standard deviation. The total of 36 normal neonate subjects include in the control group shows in table no 1. In which 19 neonates were male and 17 were female. The mean ± SD of Free T4 and TSH levels in control group neonate subjects was 0.94 ± 0.13 ng/dl & 4.96 ±3.35 uIU/ml respectively shows in table no 2.

The mean ± SD Free T4 and TSH levels in study neonate subjects was 1.13 ± 0.29 ng/dl & 5.94 ± 4.62 uIU/ml respectively shows in table no 2. The prevalence of CH among studied neonates was 5/161 or 4/161 live births. One congenital hypothyroidism detected neonate expired latter due to an unexpected cause of death. The highest value of TSH 32.3 uIU/ml was observed from the rural area's neonates. It was also observed the mean of TSH was higher in Female neonates compared to Male neonates. The comparison of TSH values among the study neonates depicted in the fig.no.2. The observed TSH mean ± standard deviation in male & female was 5.35 ± 4.33 & 6.72 ± 4.92 uIU/ml respectively.

**Table no 1: Neonates included in control group subject.**

| **Control Subjects** | |
|---|---|
| Male | 19 |
| Female | 17 |
| Total | 36 |

**Table no 2: Circulatory Free T4 & TSH levels in neonates control & study neonates.**

| Parameters | Control Subjects | Study neonates (Patients) | Total (Control+ Study neonates patients) |
|---|---|---|---|
| | **Mean ± SD** | **Mean ± SD** | Male = 90 (55.90%)<br>Female = 71 (44.10%) |
| **Free T4 ng/dl** | 0.94 ± 0.13 | 1.13 ± 0.29 | |
| **TSH uIU/ml** | 4.96 ± 3.35 | 5.94 ± 4.62 | |
| | n=36 | n=125 | 161 |

***p value < 0.05; Significant***

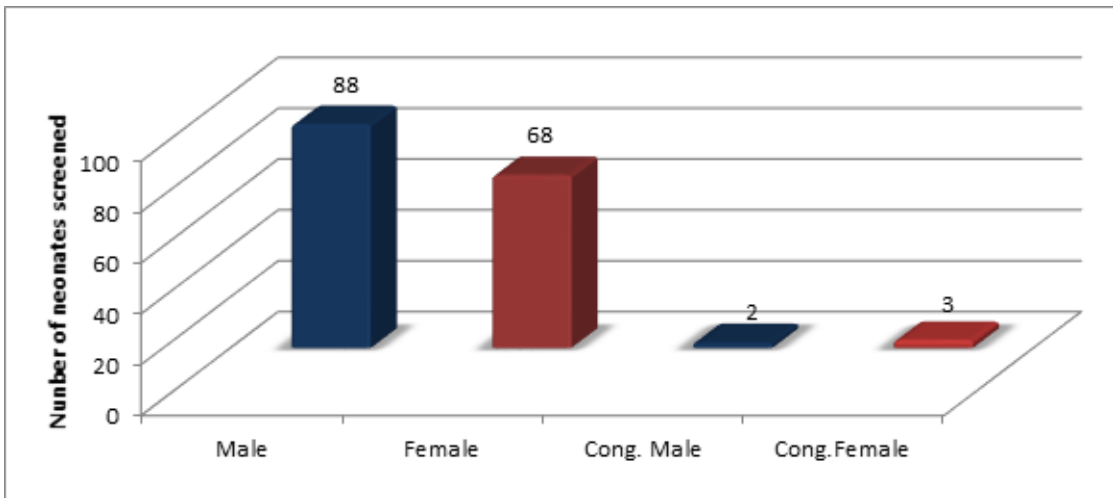


**Fig no 1. Bar chart showing the prevalence of congenital hypothyroidism among the screened neonates.**

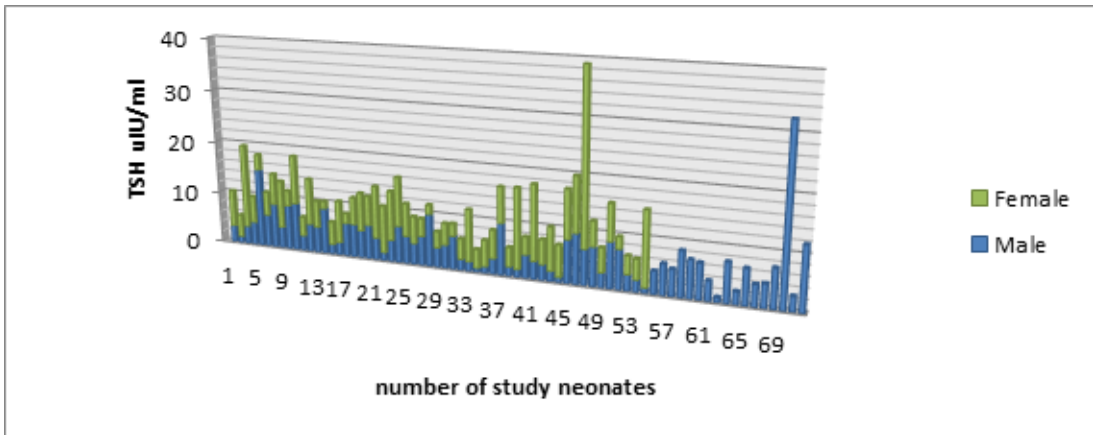


**Fig. no 2. Bar chart showing the comparison of TSH values among the study neonates.**

## Discussion

Congenital hypothyroidism is also associated with lack of iodine nutrition during the gestational period and may be induced the elevated TSH and low level of thyroxine in newborns. If CH diagnose initially and it's treatment started within a week, leads to the prevention of mental retardation in newborns. In India, an estimated

10,000 babies are born with congenital hypothyroidism every year [9, 10]. Recently, countries like the Philippines and China to have commenced the screening because waiting for a symptomatic diagnosis of affected infants mean the baby will never be normal [11,12]. The prevalence of CH in India varied from one study to another study. The CH is higher reported in Western Countries [13, 14]. However, the exact prevalence of CH in India is not known; this is largely due to the fact that neonatal screening is still not Universal in India and is only sporadically implemented at local health systems. Universal Neonatal Screening is still under development in other developing countries across Asia and Africa. In the present study the prevalence of CH is higher observed, therefore stresses on the need for routine newborn screening for all neonates, before discharge.

## Conclusion

"Prevention is better than cure" Congenital hypothyroidism (CH) is a major preventable cause of mental retardation. The worldwide incidence of CH 1 in 3000-4000 births and some studies indicating a higher incidence in India. Neonatal screening for Congenital Hypothyroidism widespread in developed countries at least past three decades. But In India it's nascent stage if the neonate doesn't screen for CH at the optimum time it leads to delay in speech and language development, and decreased attention and memory skills. Adequate follow-up strategies should come into place (important to distinguish transient and permanent CH); Newborn screening should be made compulsory in all centers for early detection and early treatment.

**Ethical Clearance: -** Ethical clearance was obtained from institutional Ethical Committee.

**Source of Funding: -** self

**Conflict of Interest:-** Nil

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