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Research Article

Incidence of Hypothyroidism (High Tsh) In Newborns Delivered Through Lscs In A Government Medical College Sindhudurg

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ABSTRACT
Congenital Hypothyroidism is most common cause of preventable mental retardation in neonates. The incidence of congenital hypothyroidism is approximately 1:2000 to 1:4000 newborns worldwide. **Incidence in India is 1:** 2500 – 1:2800 live births. Clinical manifestations of hypothyroidism in newborns are subtle, or not present at birth. Early diagnosis and treatment are of paramount importance to prevent mental retardation.
Aim and Objectives: 1. Incidence of Hypothyroidism (High TSH) in Newborns delivered through LSCS in a Government Medical College Sindhudurg.2.Study the risk factors of congenital hypothyroidism.3.Study clinical profile of Hypothyroidism in newborns
Material and Methods: Study design: Prospective study.
Study settings: Pediatric department of GMC Sindhudurg.
Study population: All newborns with hypothyroidism among LSCS cases in a GMC Sindhudurg during study period such cases were included in the study.
Study period: June 2023 To June 2025
Result: majority of cases were Females 43 (58.10%) cases and 30 (41.89%) cases were males. most of the newborn presented with 2 to 2.5 kg birth weight 49 (66.21%) cases. most of the cases Apgar score at 1 minute was >5 56 cases, most of the newborn status was AGA 67 (90.54%) most common maternal complication was anemia 23 (31.08%), Hypothyroidism in 10 (13.51%) cases, all cases presented with congenital hypothyroidism 74 followed by hypoglycemia 6, birth asphyxia 5 cases, respiratory distress 5, neonatal seizures 4,hypocalcemia 2 cases and birth trauma in 1 case. Incidence of Hypothyroidism (High TSH) in Newborns delivered through LSCS was 8.70%. There is statistically significant association between clinical outcomes with Neonatal status.
Conclusion: majority of cases were Females, Incidence of Hypothyroidism (High TSH) in Newborns delivered through LSCS was 8.70%. There is statistically significant association between clinical outcomes with Neonatal status.

Keywords: High TSH, Risk factors, congenital hypothyroidism, Cord blood TSH, newborn status.

INTRODUCTION

Congenital Hypothyroidism is most common cause of preventable mental retardation in neonates. The incidence of congenital hypothyroidism is approximately 1:2000 to 1:4000 newborns worldwide.(1,2) Incidence in India is 1: 2500 – 1:2800 live births.(1,2,3) Clinical manifestation of hypothyroidism in newborns are subtle, or not present at birth. Early diagnosis and treatment are of paramount importance to prevent mental retardation.

Countries with neonatal screening ensures early diagnosis and treatment and prevents mental retardation. In India screening for congenital hypothyroidism is limited to metropolitan cities and there is no uniform policy or methodology for screening.

Cord blood TSH (CBTSH) is an easy and noninvasive method of collection of blood and results are available before mother leaves the hospital. This ensures repeat sampling in infants with high TSH and early institution of therapy with laevothyroxin.

Neonatal screening methods use either cord blood TSH or sample from heel prick on day 3 of life. Values obtained of TSH from heel prick and from cord blood are comparable.(4) Maternal and perinatal factors influence cord blood TSH and there are very few studies from India, comparing the effects of these factors on CBTSH. Incidence of CH in central India is 3.1:1000 which is very high.(5) This study was

done at RIMS medical college which is situated in rural area of Raipur, to estimate prevalence of congenital hypothyroidism, and find various neonatal and maternal factors which can affect cord blood TSH.

Prevalence of congenital hypothyroidism in India has shown great variations according to region from where study has been done. Study from Uttar Pradesh had prevalence of 1:122,(6) Kochi in south India had prevalence of 2.1:100,(7) and AIIMS New Delhi between 2007 -2012 a pan India study reported incidence of 1:1172, with higher incidence in south Indian population.(8)

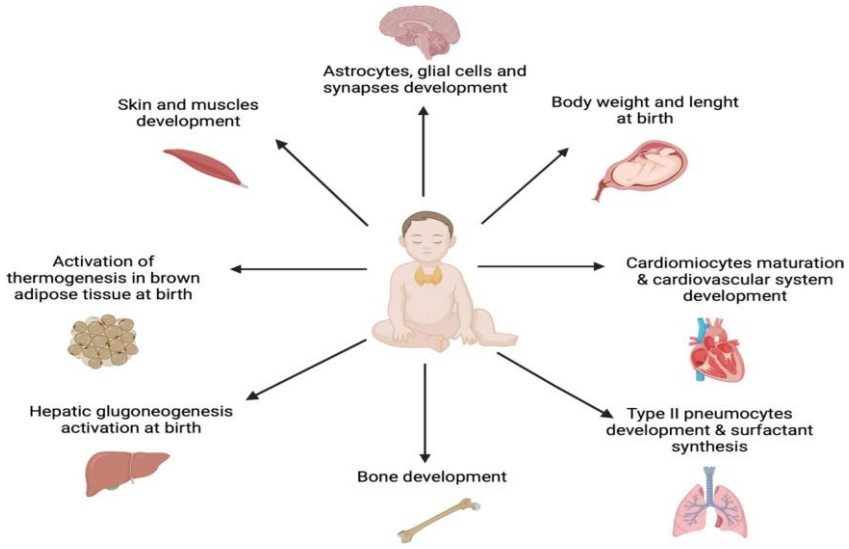


Image No. 1 Congenital Hypothyroidism

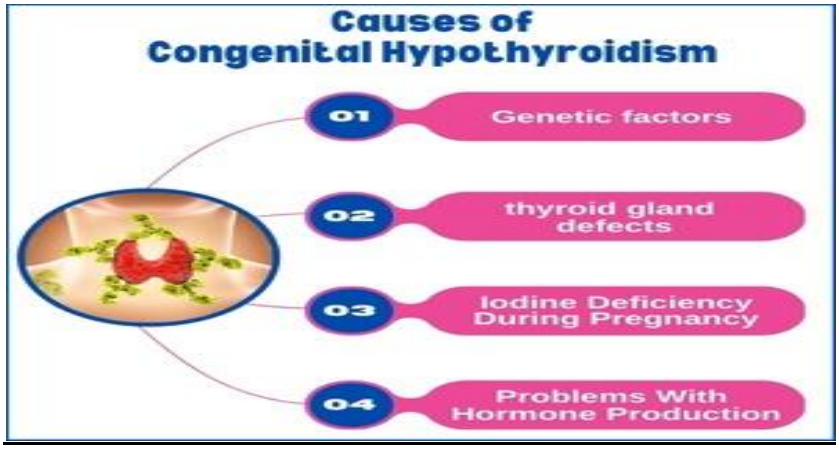


Image No. 2 Causes of Congenital Hypothyroidism

Aim and Objectives

AIM: Incidence of Hypothyroidism (High TSH) in Newborns delivered through LSCS in a Tertiary Care Hospital in India: A prospective Analytical Study

Objectives: 1. Study the Incidence of Hypothyroidism (High TSH) in Newborns delivered through LSCS.2 Study the risk factors of congenital hypothyroidism.3. Study clinical profile of Hypothyroidism in newborns.4. Study association of risk factors with congenital hypothyroidism

MATERIAL AND METHODS

Study Design: Prospective study,

Study settings: Pediatric department of GMC Sindhudurg.

Study Population: All newborns with hypothyroidism among LSCS cases in a GMC Sindhudurg during study period such cases were included in the study.

Study Period: June 2023 to June 2025.

Inclusion Criteria: All new born delivered by LSCS having hypothyroidism.

Exclusion criteria: Not willing to participate in the study, Patients who withdrawn consent

and patients with incomplete data, Infants with severe congenital anomalies or life-threatening conditions requiring immediate intervention.

Ethical Clearance: obtained from institutional ethics committee.

Methodology Specified for Data Collection

After obtaining Institutional Ethical Committee approval and written informed consent from all the parents/guardians, this prospective study was conducted in the department of pediatrics in a GMC Sindhudurg, during a period of 2 years. Patients who went DAMA or Discharges, patients who withdrawn consent and patients with incomplete data were excluded from the study

Study Procedure

The protocol of the study was accepted by the Ethical Committee of our institute. Informed consent was obtained from either of the parents. Socio-demographic data related to the study was taken from mothers and antenatal and intra partum information was noted from the records. After delivery, newborns were examined in detail for APGAR score, birth weight and any other clinical condition.

Clinical data of both mothers and newborns were recorded and entered in a predesigned proforma. About 2 ml of Cord blood sample was collected under aseptic precaution at birth time for the estimation of TSH (TSH>20Mu/l). To identify the factors affecting congenital hypothyroidism- a history about mother with thyroid disorder and on any anti-thyroid drug intake, any congenital anomalies and malformations, advanced maternal age, low birth weight babies, neural tube defects, mode of delivery, GDM mother, were ruled out.

Data Analysis

The data coded and entered into Microsoft Excel Worksheet. The categorical data expressed as rates, ratios, and proportions and the continuous data expressed as mean ± standard deviation. The comparison of categorical data performed using Chi-square test and Fisher's exact test and the comparison of continuous data done using independent sample *t*-test. $P \leq 0.05$ at 95% confidence interval considered as statistically significant.

RESULT AND OBSERVATION

All Newborns with Hypothyroidism among LSCS cases during study period such cases were included in the study

Table No.1. Distribution of Cases as Per Neonate Gender and Birth Weight (N=74)

Neonate Gender	**Frequency**	**Percentage**
Male	30	41.89%
Female	43	58.10%
Total	74	(100%)
Birth Weight	Frequency	Percentage
<1	02	2.70%
1 to 1.5	05	6.75%
1.5 to 2	18	24.32%
2 to 2.5	49	66.21%
Total	74	74 (100%)

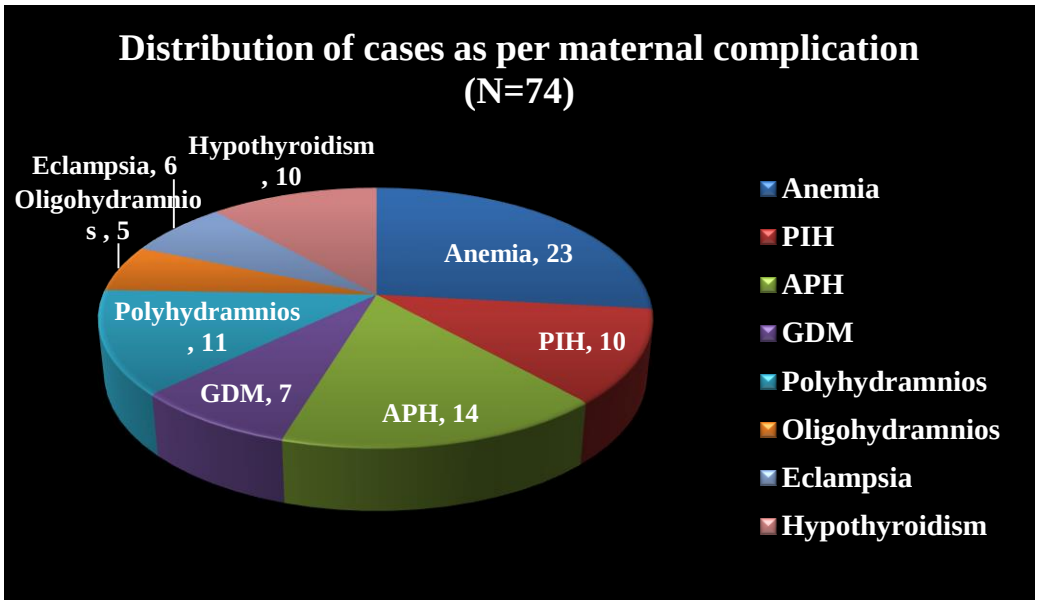
The above table shows majority of cases were Females 43 (58.10%) cases and 30 (41.89%) cases were males. most of the newborn presented with 2 to 2.5 kg birth weight 49 (66.21%) cases followed by 18 (24.32%) cases found with 1.5 to 2 kg birth weight, 05 (6.75%) cases found with 1-1.5 and 2 (2.70%) cases found with <1 kg birth weight.

Table No.2. Distribution of Cases as Per Apgar score and Newborn Status (N=74)

Apgar Score		**Frequency**	**Percentage**
1 minute Apgar	<3	00	00 %
	3-5	18	24.32%
	>5	56	75.67%
5 minute Apgar	<3	00	00%
	3-5	14	18.91%
	>5	60	81.08%
Newborn status	Frequency		Percentage
AGA	67		90.54%

SGA	06	8.10%
LGA	01	1.35%
Total	74	74 (100%)

The above table shows most of the cases Apgar score at 1 minute was >5 56 cases followed by 18 cases found with 3-5 score and Apgar score at 5 minute 60 cases found with >5 score followed by 14 cases 3-5 score. Most of the newborn status was AGA 67 (90.54%) followed by SGA 6 (8.10%) and 1 case found with LGA (1.35%)



The above figure no: 1 shows majority of cases found with anemia 23 (31.08%) followed by APH 14 (18.91%), polyhydramnios found in 11 (14.86%) cases, Hypothyroidism in 10 (13.51%) cases, PIH in 10 (13.51%) cases, GDM in 7 cases, Eclampsia in 6 cases and 5 cases observed with oligohydramnios

Table No.3. Distribution of Cases as Per Neonate Complication (N=74)

Neonate complication	Frequency	Percentage
Birth asphyxia	05	17%
Birth trauma	01	05%
Respiratory distress	05	15%
Neonatal seizures	04	04%
Hypoglycemia	06	06%
Hypocalcemia	02	02%
Congenital Hypothyroidism	74	100%

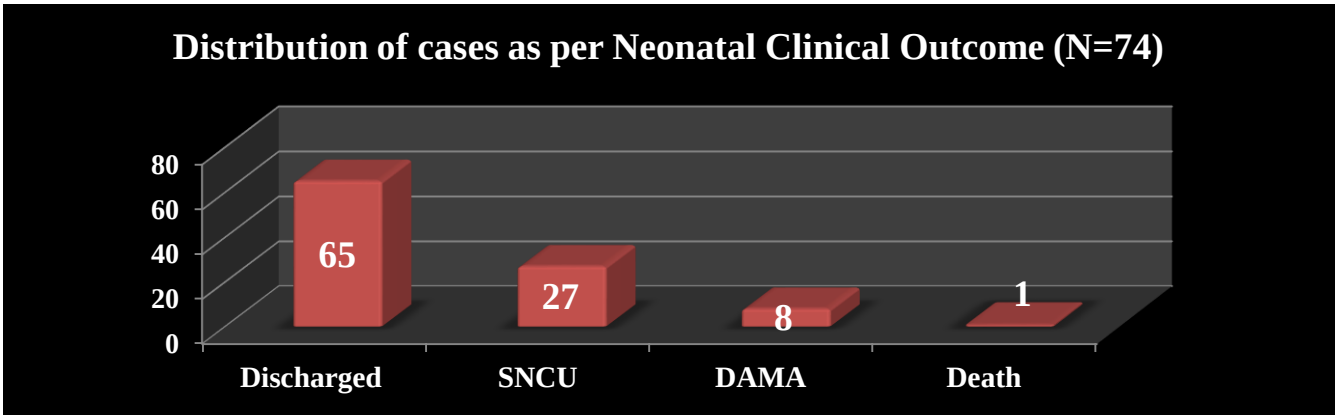
The above table shows all cases presented with congenital hypothyroidism 74 followed by hypoglycemia 6, birth asphyxia 5 cases, respiratory distress 5, neonatal seizures 4,hypocalcemia 2 cases and birth trauma in 1 case.

Table No.4. Cord Blood TSH Value (Miu/Ml) In Newborns

Cord blood TSH value	Frequency	Percentage
<20	776	91.29%
>20	74	8.70%
Total	850	74 (100%)

The above table shows total 850 newborns screened for congenital hypothyroidism 74 (8.70%) newborns positive for congenital hypothyroidism on cord blood TSH value of

more than 20μIU/ml. Incidence of Hypothyroidism (High TSH) in Newborns delivered through LSCS was 8.70%.



The above figure no: 2 shows majority of cases Discharged 65 (87.83%) followed by SNCU 27 (36.48%), DAMA in 8 (10.81%) cases and mortality in 1 case.

Table No.5. Association of Clinical Outcome with Neonatal Status

Newborn status	Mortality				
	Present	Percentage	Absent	Percentage	Total
AGA	00	00%	67	100%	67 (90.54%)
SGA	00	00%	06	100%	06 (8.10%)
LGA	01	100%	00	00%	01 (1.35%)
Total	01	1.35%	73	98.65%	74 (100%)

The Fishers exact test statistic value is 0.0135, the result is significant at $p < .05$.

Inference: There is statistically significant association between clinical outcomes with Neonatal status

DISCUSSION

Congenital hypothyroidism is the most common cause of preventable mental retardation. Early diagnosis and treatment will prevent mental retardation. Early diagnosis is hindered by paucity of clinical signs and symptoms. Diagnosis is largely based on biochemical tests. Screening for hypothyroidism is done on cord blood in many countries. No screening programme exits in India for detection of congenital hypothyroidism.

In current study newborn gender majority of cases were Females 43 (58.10%) cases and 30 (41.89%) cases were males. Kerudi MP et al (9) He found that the gender distribution of the newborns revealed that 56.7% were males, while 43.3% were females. Naik VTL et al (10) He found that the There were 1633 (74%) males and 579 (26%) females, giving a study population male to female ratio 2.8:1. Chaudhary M et al (11) He found that the Out of which, 4983 (52.10%) were males and 4575 (47.90%) were females.

In current study most of the newborns presented with 2 to 2.5 kg birth weight 49 (66.21%) cases followed by 18 (24.32%) cases found with 1.5 to 2 kg birth weight , 05 (6.75%) cases found with 1-1.5 and 2 (2.70%) cases found with <1 kg birth weight.

Kerudi MP et al (9) He reported that the in terms of birth weight, the study observed that the majority of newborns had a birth weight between 2.0-2.5 kg, accounting for 56.7% of the cases. Additionally, 29.3% had a birth weight greater than 2.5 kg, 12.7% fell within the range of 1.5-2.0 kg, and only 1.3% had a birth weight below 1.5 kg.

Chaudhary M et al (11) He found that the Most of the neonates (93.25%) weighed between 2 and 4 kg (48.05% in 2–3 kg and 45.21% in 3–4 kg group). The 4.94% and 1.77% neonates were <2 kg and more than 4kg, respectively.

In current study most of the cases Apgar score at 1 minute was >5 56 cases followed by 18 cases found with 3-5 score and Apgar score at 5 minute 60 cases found with >5 score followed by 14 cases 3-5 score. Kerudi MP et al (9) The study also assessed the Apgar scores of the newborns, which reflect their

overall well-being and vital signs at 1 and 5 minutes after birth. The analysis revealed that 9.3% of the babies had an Apgar score below 7 at 1 minute, while 2% had an Apgar score below 7 at 5 minutes.

In current study shows maternal risk factors majority of cases found with anemia 23 (31.08%) followed by APH 14 (18.91%), polyhydramnios found in 11 (14.86%) cases, Hypothyroidism in 10 (13.51%) cases, PIH in 10 (13.51%) cases, GDM in 7 cases, Eclampsia in 6 cases and 5 cases observed with oligohydramnios. Kerudi MP et al (9) He reported that the maternal hypothyroidism was identified in 7.3% of the cases, gestational diabetes mellitus (GDM) in 4.0% of the cases. Anisha Beegum L (12) he found that the Out of 10 mothers screened, two of them were found to have hypothyroidism.

In current study most of the newborn status was AGA 67 (90.54%) followed by SGA 6 (8.10%) and 1 case found with LGA (1.35%). Kerudi MP et al (9) He reported that the vast majority (89.3%) of the babies were classified as AGA, while 10.0% were categorized as SGA, and only 0.7% fell into the LGA category.

In current study newborns complications all cases presented with congenital hypothyroidism 74 followed by hypoglycemia 6, birth asphyxia 5 cases, respiratory distress 5, neonatal seizures 4, hypocalcemia 2 cases and birth trauma in 1 case. Emmi Danner et al (13) Diagnoses of neonatal and chronic diseases were collected for 438 full-term patients and 835 controls (median follow-up time 11.6 years; range, 0-23 years). Newborns with CH were more often found to have neonatal jaundice (11.2% and 2.0%; $P <$ .001), hypoglycemia (8.9% and 2.8%; $P <$ .001), metabolic acidemia (3.2% and 1.1%; $P =$ .007), and respiratory distress (3.9% and 1.3%; $P <$ .003) as compared to their matched controls. Congenital malformations were diagnosed in 66 of 438 (15.1%) CH patients and in 62 of 835 (7.4%) controls ($P <$ .001)

In current study total 850 newborns screened for congenital hypothyroidism 74 (8.70%) newborns positive for congenital hypothyroidism on cord blood TSH value of more than 20μIU/ml. Incidence of Hypothyroidism (High TSH) in Newborns delivered through LSCS was 8.70%.Chaudhary M et al (11) He found that the incidence of hypothyroidism was calculated as 1.37 per 1000 live births (13/9500) with a recall rate of 5.57% (533/9558).

Another study by Vinay Kumar et al (14) He found that the out of total 4057 newborns who were screened, 341 (8.4%) came out to be positive for congenital hypothyroidism on cord blood TSH value of more than 20 μIU/ml. Anand MR et al (15) He reported that the incidence of congenital hypothyroidism in their study as 4.1 per 1000 live births (8/1950). Kaur G et al (16) in Chandigarh reported exceptionally very low incidence of 0.29 per thousand live births. However, instead of TSH alone, they used T3, T4, and TSH to confirm CH.

In current study clinical outcomes majority of cases Discharged 65 (87.83%) followed by SNCU 27 (36.48%), DAMA in 8 (10.81%) cases and mortality in 1 case. Emmi Danner et al (13) he found that the Newborns with CH were more often found to have neonatal jaundice (11.2% and 2.0%; $P <$ .001), hypoglycemia (8.9% and 2.8%; $P <$ .001), metabolic acidemia (3.2% and 1.1%; $P =$ .007), and respiratory distress (3.9% and 1.3%; $P <$ .003) as compared to their matched controls.

In current study shows there is statistically significant association between clinical outcomes with Neonatal status. Pikala Tarakeswara Rao et al (17) He observed that the Positive significant correlation of T4 with gestational age was observed ((r=0·68 and P<0·01). TSH negatively correlated significantly with gestational age (r=−0·34 and P<0·01). Significant difference in mean T4 and TSH was noted in low birth weight (LBW) and in neonates weighing >2.5kg

CONCLUSION

Majority of cases were Females, Incidence of Hypothyroidism (High TSH) in Newborns delivered through LSCS was 8.70%. There is statistically significant association between clinical outcomes with Neonatal status.

REFERENCES

1. Vidavalur R. Human and Economic Cost of Disease Burden Due to Congenital Hypothyroidism in India: Too Little, but Not Too Late. Front Pediatr. 2022; 10:788589.
2. Rastogi MV, LaFranchi SH. Congenital hypothyroidism. Orphanet J Rare Dis. 2010; 5:17.
3. Desai MP. Congenital hypothyroidism: Screening dilemma. Indian J Endocrinol Metab. 2012;16(Suppl 2):S153-5.

4. Al-Mendalawi MD. Neonatal thyroid screening: Relationship between cord blood thyroid stimulating hormone levels and thyroid stimulating hormone in heel prick sample on 4(th) to 7(th) day-of-life. Indian J Endocrinol Metab. 2015; 19(1):188-9.
5. Patel S, Priya R, Padhi P, Naik T, Abraham J, Nanda R, et al. Prevalence of Congenital Hypothyroidism and G6PD Deficiency in Newborns in a Tertiary Care Hospital of Central India. J Neonatol. 2021; 35(1):5–9.
6. Gopalakrishnan V, Joshi K, Phadke S, Dabadghao P, Agarwal M, Das V, et al. Newborn screening for congenital hypothyroidism, galactosemia and biotinidase deficiency in Uttar Pradesh, India. Indian Pediatr. 2014; 51(9):701-5.
7. Sanghvi U, Diwakar KK. Universal newborn screening for congenital hypothyroidism. Indian Pediatr. 2008; 45(4):331-2.
8. Prabhu SR, Mahadevan S, Jagadeesh S, Suresh S. Congenital Hypothyroidism: Recent Indian data. Indian J Endocrinol Metab. 2015; 19(3):436-7.
9. Kerudi MP, Kumar GM, Mahendrappa KB. An observational study on the prevalence of congenital hypothyroidism and factors affecting TSH levels in premature babies at tertiary care rural centre. Int J Contemp Pediatr 2023; 10:1293-7.
10. Naik VTL, Panigrahi B, Panda S. Neonatal thyroid screening a tertiary care experience at VSS Medical College and Hospital, Burla. Int J Contemp Pediatr 2021; 8:280-4.
11. Chaudhary M, Soni JP, Goyal VK, Sharma P, Makwana M, Lora SS. Incidence of congenital hypothyroidism in Western Rajasthan using cord blood thyroid-stimulating hormone levels as a screening tool: A cross-sectional hospital-based study. Indian J Endocr Metab 2018;22:417-20
12. Anisha Beegum L. Study to Assess the Prevalence of Congenital Hypothyroidism in New Born and Assess the Effectiveness of Planned Teaching Programme Regarding Hypothyroidism Among Mothers of Neonates Delivered at Military Hospital in Jabalpur City. RGUHS Journal of Nursing Sciences. 2021, Volume: 11, Issue: 3, Page no. 87-90, DOI:10.26715/rjns.11_3_3
13. Emmi Danner, Jarmo Jääskeläinen, Laura Niuro, Hanna Huopio, Harri Niinikoski, Liisa Viikari, Jukka Kero, Reijo Sund, Comorbidity in Congenital Hypothyroidism—A Nationwide, Population-based Cohort Study, *The Journal of Clinical Endocrinology & Metabolism*, Volume 108, Issue 12, December 2023, Pages e1695–e1701, https://doi.org/10.1210/clinem/dgad334
14. Vinay Kumar, Ashwani Kumar Sood, Manoj Kumar Gandhi. Screening for congenital hypothyroidism in tertiary care hospital of northern Indian hilly state. GJRA volume - 10, issue - 03, March - 2021 • print issn no. 2277 - 8160 • doi: 10.36106/gjra.
15. Anand MR, Ramesh P, Nath D. Congenital Hypothyroidism Screening with Umbilical Cord Blood: Retrospective Analysis. Indian Pediatr. 2015; 52(5):435-6.
16. Kaur G, Srivastav J, Jain S, Chawla D, Chavan BS, Atwal R, et al. Preliminary report on neonatal screening for congenital hypothyroidism, congenital adrenal hyperplasia and glucose-6-phosphate dehydrogenase deficiency: A Chandigarh experience. Indian J Pediatr 2010; 77:969-73.
17. Pikala Tarakeswara Rao, Sai Sunil Kishore, Y V Siva Sankara Murty, Pundarikaksha Varanasi, Madhusudhan K, Prudhvi Krishna K. Determinants of thyroid function in neonates at birth. Pediatr Rev: Int J Pediatr Res 2015; 2(3):30-36.