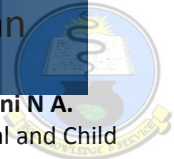


# Preliminary results and normative Thyroid stimulating hormone (TSH) values for healthy Nigerian newborn children.



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## Introduction

Screening for congenital hypothyroidism is mandatory for all newborns in most developed countries though this is yet to be established in many developing countries. Congenital hypothyroidism is the commonest congenital endocrine disorder in the world and also the commonest most preventable cause of mental retardation. There is no prevalence rate in Nigeria, making this study very important for prevention of mental retardation and allowing for policy making.

## Aim and Objectives

The study aimed to screen normal newborn babies born in different regions in Nigeria for congenital hypothyroidism

Objectives:

- Determine the incidence of congenital hypothyroidism in Nigeria.
- Determine the normal range of TSH in newborns in Nigeria.
- Check for associations between TSH values and certain variables.

## Methods

A cross-sectional study was carried out between January 1st 2013 and December 31st 2013 in 6 different tertiary health institutions in Nigeria. Included in the study were normal newborn babies born in tertiary health institutions, whose parents gave informed consent and excluded were sick babies, preterm babies, and those born with various congenital abnormalities.

The subjects were recruited from the labour wards, post-natal wards and delivery theaters of the collaborating institutions. Previously trained nurses, resident doctors and collaborating paediatric endocrinologist counselled parents and collected blood samples from the cord or heel prick depending on which of these was appropriate and / or convenient at that time.

Cord blood was collected from the fetal end of the umbilical cord immediately it was severed from the placenta. Four (4) drops of blood was placed on 4 concentric circles on a Whatman filter paper.

## Results

A total of 2014 subjects were recruited during the study period. There were 1040 (52%) female and 974 (48%) males giving a female : male ratio of 1.07 : 1. There were 1543 (76.6%) of subjects who had TSH levels within normal range with regards to international reference values Table 1. The mean TSH value for the subject was 1.86 uIU/mL ( $\pm 2.25$ ), with a range of 0.09 – 25.7.

Table 1: Frequency distribution of TSH levels among subjects

TSH levels	Frequency	Percent	Cum Percent
0.009 – 0.349 (Low)	356	17.7	17.7
0.35 – 5.5 (Normal)	1543	76.6	94.3
5.51 – 9.99 (High)	93	4.6	98.9
10.00 – 50 (Elevated)	22	1.1	100.0
<b>Total</b>	<b>2014</b>	<b>100.0</b>	

Table 2: Mean TSH levels in different socioeconomic classes

	N	Mean	SD	95% C I for Mean		Min	Max
				Lower Bound	Upper Bound		
1.00	125	1.70	2.00	1.34	2.05	.0990	13.10
2.00	438	1.88	2.25	1.67	2.09	.0990	15.60
3.00	578	1.88	2.48	1.67	2.08	.0990	25.70
4.00	873	1.86	2.13	1.72	2.00	.0990	17.60
<b>Total</b>	<b>2014</b>	<b>1.86</b>	<b>2.26</b>	<b>1.76</b>	<b>1.96</b>	<b>.0990</b>	<b>25.70</b>

Fig 1: Boxplot showing mean TSH levels according to birth cities

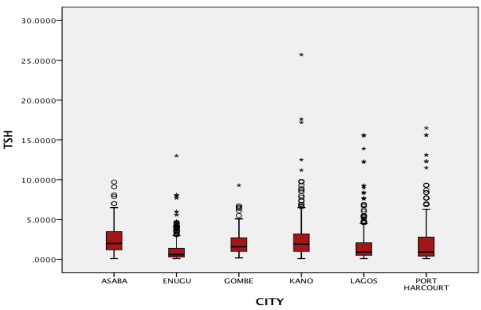
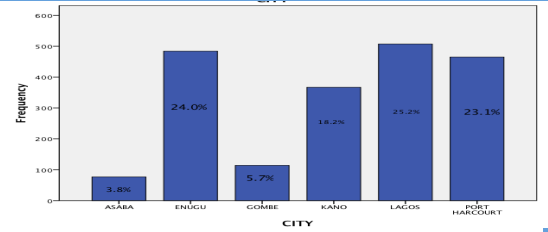


Fig 2: Frequency distribution of subjects from birth cities



## Discussion

The mean TSH level of the subjects is similar to those obtained in the countries doing newborn screening. The range is a bit wider with a higher limit of normal in the present study. The difference is not much and it may be attributed to the region with some iodine deficiency. No child with hypothyroidism has been picked up with this programme thus far so there is no incidence report.

The mean TSH levels for each category of birth weight were similar. This means the reference range generated from this study can be used for all term and normal babies in Nigeria, and also small for gestational age (SGA) and large for gestational age (LGA) babies as long as the babies are normal.

Even though there were more subjects in the lower socioeconomic classes (SEC), there was no difference in mean TSH levels within the classes. The SEC of a subject does not determine the risk for development of CH unless in regions with iodine deficiency where transient hypothyroidism may be prevalent.

All cities apart from Asaba and Gombe had subjects with TSH levels greater than 10uIU/mL, possibly due to the fewer subjects that were recruited from those cities

## Conclusion

The study has succeeded in highlighting the normal reference values for TSH in Nigeria newborns and that TSH values are not determined by the sex, socioeconomic class, and birth weight, but may be affected by the birth city.

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