

Newborn Screening for Congenital Hypothyroidism in Egypt

"A Model Program for Developing Countries"

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- Neonatal screening for congenital hypothyroidism (CH) is an essential and productive preventive public health program.
- Screening program started in 1974 as a pilot study in Quebec and Pittsburgh, and since then it has become a routine system for neonatal screening essentially in all developed countries.



The Egyptian Ministry of Health and Population started to implement the screening program for CH in the year 2000, in five governorates and by the end of the year 2003 all 27 Governorates were covered. The neonatal screening services are free of charge.



Objectives of the Screening Program for CH

- To decrease the incidence of mental retardation caused by CH.
- To provide facilities for diagnosis and management for the discovered cases in different specialized and public health facilities.



Methods of Screening

- Measurement of neonatal TSH in dry blood spot on filter paper followed by serum TSH and free T4 measurements for suspected positive cases.




Steps followed in the Screening Program for CH

- Samples are collected from the 3rd – 7th post natal day every Saturday and Tuesday.
- Measurements of neonatal TSH, from a prick heel capillary sample using ELISA technique.
- Samples are taken on a filter paper S&S #903
- Biological data are included with filter paper.



5. The cut-off point for neonatal TSH is 15 $\mu\text{g/ml}$.

6. Samples are considered positive if neonatal TSH $\geq 15 \mu\text{g/ml}$.

7. A Second dry blood sample is required from all cases with a TSH 15-40 $\mu\text{g/ml}$.



8. Serum TSH and Free T4 measurements are done for all suspected positively screened cases

9. Collecting blood samples is done through PHC units and outreach program for the unreached population in rural areas



10. Checking the blood samples on filter paper for proper sample collection:

- Complete circle
- No overlap of 2 blood spots
- Fully saturated filter paper
- Checking biosocial data

11. Samples are transferred to central and regional laboratories where measurements of neonatal TSH take place



12. Results of laboratory TSH estimation are announced every Monday and Thursday.

13. Suspected positive cases are notified, and directed to the laboratory in the catchment area for serum TSH and free T4 estimation.

14. Confirmed cases are referred to the specialized health insurance centers for treatment and follow up



Achievements of the Egyptian Neonatal Screening Program

■ Coverage:

- 1- Twenty seven Governorates were covered through 3200 primary health care (PHC) facilities and outreach service.
- 2- The total number of screened neonates is about 4.8 millions by the end of December 2005.
- 3- Coverage ranged from > 95% in some rural areas to 75% in urban areas.



- Laboratory estimation of neonatal TSH, and serum TSH and freeT4 was performed in 14 central and regional laboratories.



🇪🇬 Diagnosis, management, and follow-up of cases took place in 25 health insurance centers geographically distributed all over Egypt.



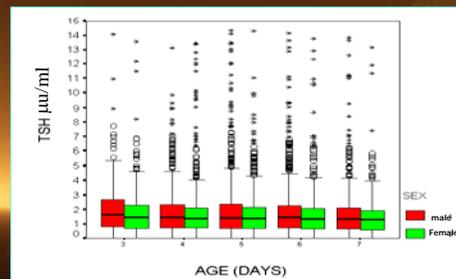
Program Indicators

| Indicator | Definition | Mean (day) | ±SD |
|----------------------------------|---|------------|-----|
| 1. Timeliness | | | |
| ✓ Mean interval for confirmation | Time lapse from birth to confirm test | 13.45 | 6.5 |
| ✓ Mean time of ttt initiation | Time lapse from taking first dry sample to start ttt. | 10.3 | 7.3 |
| ✓ Time of screening results | % of results available within 2 working days of receipt by lab | 100% | |
| 2. Recall Rate | Number of positively screened cases/total number of screened neonates | 0.17% | |
| 3. Dropout Rate | Number of positive screened babies who did not come for confirmation /total number of +ve screened babies | 12.6% | |

Program Indicators

| Parameter | Definition | Rate |
|--------------------------|--|--------|
| Permanent hypothyroidism | The number of children ≥ 3 y. Old who are under ttt /the total screened neonates in the same period | 1:2020 |
| Transient hypothyroidism | The number of children stopped ttt after reevaluation/ total screened neonates in the same period | 1:6956 |
| False positive rate | The number of -ve confirmation results /total number of positively screened neonates. | 34.6% |

Boxplot for TSH Levels by Age & Sex



- Median TSH level is around $1 \mu\text{u/ml}$
- Median TSH level is decreased with increasing age
- Median TSH level of males is more than females but not significantly different.

