



## Mother's Awareness Regarding Their Infants Suffering from Congenital Hypothyroidism

Moamena Mohamed Mohamed Abdelmonem<sup>(1)</sup>, Prof. Dr. Sahar Ahmad  
Shafik<sup>(2)</sup>, Dr/ Ons Said El-Zayat<sup>(3)</sup>

- 1.BSc. in Nursing Science, Bani suef University.
2. Professor of Community Health Nursing, Faculty of Nursing, Fayum University & College of Nursing, National University of Science and Technology, Iraq. **E-mail:** Sas19@fayoum.edu.eg **orcid numbers:** 0000-0003-3247-4823
3. Assistant professor of Community Health Nursing, Faculty of Nursing, Helwan University.

**Corresponding Author: Moamena Mohamed Mohamed Abdelmonem**  
[Menamohamed2abd@gmail.com](mailto:Menamohamed2abd@gmail.com)

### ABSTRACT

**Background:** Types of Congenital hypothyroidism are classified into permanent and transient (CH). Permanent (CH) refers to a persistent deficiency of thyroid hormone that requires life-long treatment. Transient CH refers to a temporary deficiency of thyroid hormone, discovered at birth, but then recovering to normal thyroid hormone production. Recovery occurs in the first few months or years of life. Permanent (CH) can be further classified into permanent primary and secondary (CH) transient primary (CH) has also been reported associated with defects in other organ systems. The underlying etiology of (CH) typically will determine whether hypothyroidism is permanent or transient. **The study aims to** assess the mother's awareness regarding their infants suffering from congenital hypothyroidism. **Design:** A descriptive research design was used in this study. **Sample:** A purposive sample equal 88 child with Congenital hypothyroidism. **Setting:** This study was conducted at the thyroid clinic affiliated to the Health Insurance in Beni-Suef Governorate. The clinic provides treatment and follow-up services for children suffering from thyroid hormone imbalance at Beni-Suef Governorate. **Results:** the study result revealed that 50.0% of mothers had average total knowledge regarding congenital hypothyroidism ,30.0% of mothers had poor knowledge, 55.0% of mothers positive attitude regarding congenital hypothyroidism .While, 40.0% of them had correctly done practice, **Conclusion:** The half of informal caregivers had an average knowledge about congenital hypothyroidism however one third had a poor knowledge. one fifth of studied sample reported no practice about congenital hypothyroidism and there were a highly statistically significant relation between total knowledge score , total attitude score and total reported practices score for their mothers.

**Keywords:** Mothers , Awareness, Congenital hypothyroidism.

**DOI: 10.48047/ecb/2023.12.Si8.599**

### INTRODUCTION

Congenital Hypothyroidism (CH) one of the most prevalent endocrine and metabolic disorders in children that can affect their quality of life. If, it is left untreated, it can become a serious threat to a child's health and physical growth and mental development. CH occurs when there is a reduction of production of thyroid hormones. They function as regulators of metabolism and are essential for the development of the central

nervous system. Worldwide, congenital hypothyroidism has an incidence of 1: 3,000 to 4,000 live births and is the most common cause of preventable intellectual disability. Early detection of congenital hypothyroidism is accomplished through newborn screening tests (Venugopalan et al., 2021).

Congenital hypothyroidism occurs when the thyroid gland does not develop or function normally before birth This type of hypothyroidism occurs in about 1 in 1,700 to 3,500 live births. Most cases occur

spontaneously, but about 10 to 20% are inherited. About half of cases of congenital hypothyroidism occur because the thyroid gland is missing, underdeveloped, or developed in the wrong place. Less often, the gland has developed normally but does not produce thyroid hormone correctly. **Abdelmuktader, (2013).**

About 50% of affected children have a family history of autoimmune thyroid disease. Autoimmune thyroiditis occurs most commonly during adolescence, but it can also occur in younger children, typically after the first few years of life. Children who have Down syndrome are at increased risk of autoimmune thyroiditis.

Worldwide, the most common cause of hypothyroidism is iodine deficiency, but this cause is rare in the United States. However, pregnant women in the United States can develop mild iodine deficiency because their bodies need more iodine when they are pregnant. Children who have multiple food allergies or who are following restrictive diets may not eat enough of the proper foods and thus develop iodine deficiency. Other less common causes of acquired hypothyroidism include radiation therapy to the head and neck for certain cancers and the use of certain drugs (for example, lithium or amiodarone). Hypothyroidism also occurs as a result of treatment for hyperthyroidism or for thyroid cancer. Santos et al (2020).

Symptoms of hypothyroidism differ depending on the age of the child. Infants and young children : If iodine deficiency occurs very early during pregnancy, infants may have severe growth failure, abnormal facial features, intellectual disability, and stiff muscles that are difficult to move and control (called spasticity). Most other infants who have hypothyroidism initially have few if any symptoms because some thyroid hormone from the mother crosses the placenta. Once infants no longer receive thyroid hormone from the mother, symptoms develop slowly and the disease is detected only when they are screened as newborns. However, if hypothyroidism remains untreated, brain development slows and infants may have low muscle tone, hearing loss, a large tongue, poor feeding, and hoarse crying. Delayed diagnosis and treatment of severe hypothyroidism can lead

to intellectual disability and short stature. **Poornima and Padmaja (2018).**

Treatment of thyroid hormone Children who have congenital or acquired hypothyroidism are usually given the synthetic thyroid hormone levothyroxine. Thyroid hormone replacement usually is given to children in tablet form. For infants, tablets can be crushed, mixed with a small amount (1 to 2 milliliters) of water, breast milk, or non-*soy*-based formula, and given by mouth by syringe. It should not be given simultaneously with *soy* formula, or iron or calcium supplements because these substances can decrease the amount of replacement thyroid hormone that is absorbed. Liquid formulations are available commercially for children of any age, but there is limited experience with the use of these formulations in the treatment of congenital hypothyroidism. **Alabama Department of Public Health - Newborn Screening, (2018).**

Congenital Hypothyroidism (CH) one of the most prevalent endocrine and metabolic disorders in children that can affect their quality of life. If, it is left untreated, it can become a serious threat to a child's health and physical growth and mental development. CH occurs when there is a reduction of production of thyroid hormones. They function as regulators of metabolism and are essential for the development of the central nervous system. Worldwide, congenital hypothyroidism has an incidence of 1: 3,000 to 4,000 live births and is the most common cause of preventable intellectual disability. Early detection of congenital hypothyroidism is accomplished through newborn screening tests (**Venugopalan et al., 2021**).

Community health nurse play an important role in teaching mothers about the importance of proper medication administration and the doctor will see the child regularly to make sure that the medicine is working and change the dose as the child grows. Be sure to go to all follow-up doctor visits. Monitor thyroid hormone levels frequently, because thyroid hormone is crucial for brain development. Children with congenital hypothyroidism can Mothers' Knowledge and Practice regarding Care of their Children with Congenital hypothyroidism can sometimes develop hearing problems. If you have any concerns about child's hearing or speech

development, talk to the doctor. Psychomotor development and school progression should be monitored (Santos et al., 2021).

### **SIGNIFICANCE OF THE STUDY**

**In Egypt**, the overall incidence of CH was 1:2,020 live births in 2015. The Egyptian Ministry of Health and Population started to implement the screening program for (CH) in 2000 in 5 governorates, and by the end of 2003, all 27 Governorates were covered (Vigone & Frenna, 2016).

Community health nurses involved with newborn screening programs and treatment program of (CH). Should participate in the design of evaluations to ensure that critical processes related to health education are covered with the development, implementation, and assessment of newborn screening would improve the effectiveness of these programs. In addition, will be a driving force in implementing changes suggested by evaluation efforts (Puryear & Tonniges, 2018).

### **AIM OF THE STUDY:**

The study aims to assess mother's awareness about their children suffering from congenital hypothyroidism through the following objectives

- Assessing mothers' knowledge and attitude about congenital hypothyroidism
- Determining mothers' reported practice about congenital hypothyroidism

### **RESEARCH QUESTIONS:**

- What are mothers' levels of knowledge about congenital hypothyroidism?
- What are mothers' attitudes about congenital hypothyroidism?
- What are mothers' reported practices dealing with congenital hypothyroidism for their infants?

### **SUBJECT AND METHODS**

**I- Technical Item:** The technical item includes research design, setting, subject and tools for data collection.

**Research design:** A descriptive research design was applied to achieve the aim of this study.

**Setting:** This study will be conducted at the thyroid clinic affiliated to the Health Insurance in

Beni-Suef Governorate. The clinic provides treatment and follow-up services for children suffering from thyroid hormone imbalance at Beni-Suef Governorate

**Sampling:** Purposive sample of mothers' have infants diagnostic with congenital hypothyroidism. The total number of infant last year 2020-2021 was 180 cases and will be selected of 88 cases with the following inclusion criteria:

- 1-Infant diagnostic with congenital hypothyroidism
- 2-Age from newborn to 6 years
- 3-Accepting to participate in the study

**Tool for data collection:** One tool was used to collect data achieving of study aim:

**Tool I: A structured interviewing questionnaire:** This tool was developed by the researcher after reviewing the national and international related literature and contains four parts:

#### **Part I:**

**A) Socio demographic characteristics of mothers:** includes age, level of educational, place of residence, family relation and occupation, monthly income, and mothers occupation

**B) Mothers regarding previous pregnancy and birth data:** Concerned with number of pregnancy, number of abortion, number of births, types of birth, RH factor, follow up for the last pregnancy, received health education during last pregnancy about congenital hypothyroidism, medical test during last pregnancy, chronic diseases and family members suffers from congenital hypothyroidism

#### **Part II: Mothers' knowledge about congenital hypothyroidism:**

Concerned with mother's knowledge about congenital hypothyroidism such as meaning of (CH), causes, signs and symptoms, types, diagnostic tests, complications, treatment, and child test analysis to determine the dose of treatment.

**Scoring system:** for knowledge questions, a correct answer was scored (2 points) and incorrect answer was scored (1 point), while the wrong answer or don't know was given (Zero point), Total

knowledge scores were classified as follows: The total score knowledge divided into the following:

- (Good knowledge)  $\geq 75\%$ ,
- (Average knowledge)  $\geq 50\% - 75\%$
- And (Poor knowledge)  $< 50\%$ .

**Part III: Mothers' attitude regarding their child with congenital hypothyroidism: Developed by (Julie, 2013)**

Concerned with mother's attitude regarding (CH) such as newborn screening, child medications and laboratory tests follow up, Do you think neonatal screening is important if your child looks healthy, and Do you think that increasing your awareness of hypothyroidism is useful for dealing with a child.

**Scoring system:** The answers to these questions were scored as "1" for always," "2" for sometimes, and "0" for never.

**Total attitude scores** were classified as follows: The total score attitude divided into the following:

Negative attitude  $< 50\%$ . Positive attitude  $\geq 50\%$ .

**Part IV: Mothers' reported practice regarding their child with congenital hypothyroidism. Developed by (Kliegman et al., 2015)**

Concerned with mother's practice regarding (CH) such as Medication recommended, nutrition recommended and other recommendation, you sure of the expire date of the treatment before giving it to the child, you give the child compulsory vaccinations according to the schedule in the specific referent, and making a written schedule to make sure you give the child treatment every day.

**Ethical considerations:**

An official permission to conduct the proposed study was being obtained from the Scientific Research Ethics Committee at faculty of nursing Helwan University. Participation in the study was voluntary and subjects was be given complete full information about the study and their role before signing the informed consent. The ethical considerations was include explaining the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of the information where it was not be accessed by any other party without taking permission of the participants. Ethics, values, culture and beliefs was be respected.

**II- Operational Item:**

**Preparatory phase:**

It was include reviewing of past, current, national and international related literature and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines to develop tools for data collection.

**Pilot study:**

The pilot study has been conducted to test clarity of questions, applicability and understanding of tool. It has been conducted on 10 % of the sample (9 ) sample. The results of the pilot study helped in refining the interview questionnaire and to schedule the time framework. The participants of pilot were included in the main study sample.

**Field work:**

Data collection of the study was started at the beginning of February 2021 until the end of July 2021. The investigator introduced herself to the mothers , explained the aim of the study and its implication and how to fill in knowledge questionnaire, and ensure their cooperation. Informed consent was obtained from the participants. Interviewing their mothers was carried out in specialized room in the outpatient clinics in Health Insurance in Beni-Suef Governorate).

**III- Administrative Item:**

After explanation of the study aim and objectives, an official permission was obtained from the Dean of faculty of nursing and the general manager of the outpatient clinics in Health Insurance in Beni-Suef Governorate asking for cooperation and permission to conduct the study.

**IV-Statistical Item:**

Data collected from the studied sample was revised, coded and entered using personal computer (PC). Computerized data entry and Statistical analysis were fulfilled using Statistical Package for the Social Science (SPSS) version 24. Data were presented using descriptive statistic in the form of frequencies, percentages. Chi-square was used for comparisons between qualitative variables. Spearman correlation measures the strength and direction of association between two ranked variables.

**RESULTS**

---

### Part I: Demographic Characteristics of Studied Sample

**Table (1)** Cleared that ,36.4% of mothers were the age group 20 -< 30 years with a mean  $\pm$  SD was  $33.2 \pm 4.7$ . Regarding to the mother level of education;50.0% of them had basic education and only 12.5% of them had university education or more .Also, 51.2% of them relationship between spouses and 73.8% of them had first degree of family relation with their husband .

**Table (2)** : Cleared that, 48.8% of them had two number of pregnancy , 82.9% of them no abortion , 51.2% of them had two birth of children , 62.5% of them the types of delivery by caesarian section, 86.3% of them the negative RH factors , 62.5% of them follow-up for the last pregnancy ,71.0% of them had follow up in gynecologist doctor , 90.9% of them no received health education during the last pregnancy for congenital hypothyroidism and heel test analysis , 62.5% of them receive the health education by the nurses , 90.9% of them performed analysis RH, sytoplasmosis during the last pregnancy , 28.4% of mothers had complain diabetics ,96.9% of them had receive treatment for a particular disease and 94.4% of them no family member who suffers from congenital hypothyroidism

#### Regarding to research question Q1: What are mothers' levels of knowledge about congenital hypothyroidism?

**Table (3)** : Shows that, 62.5% of the studied mothers had incorrect knowledge about meaning of congenital hypothyroidism , 68.2% of them had incorrect knowledge about causes of congenital hypothyroidism. Also , 62.4% of them had incorrect knowledge about treatment of congenital hypothyroidism , 68.2% of them had incorrect knowledge about the required tests to ascertain the dosage of the medicine required , while , 51.1% of them had correct knowledge about the doctor determine the dose of treatment required

**Table (4)** : Illustrates that,100.0% mothers had agree about the made of laboratory tests for the child to make sure that his condition is useful for the child. 62.5% of them had agree about neonatal screening is important if your child looks healthy is newborn screening still necessary, 56.8% of them had natural about the survey program for newborn babies is ethically justified ,and 56.8% of them had disagree about

the program for thyroid screening is harmful to newborn babies.

### Part III: Studied Sample' reported practices regarding congenital hypothyroidism

**Regarding to research question:** What are mothers' reported practices dealing with congenital hypothyroidism for their infants?

**Table (5)** : Shows that , 100.0 % of the mothers not done practice regarding give a double dose of treatment if you forgot to give it a day, you give the child compulsory vaccinations according to the schedule in the specific referent .Also , 62.5% of them done practice regarding you giving treatment to the child in the specific formula every day and 43.2% of them don't know regarding you making a written schedule to make sure you give the child treatment every day

**This table (6)** reflected that there was a highly statistically significant relation between total knowledge score , total attitude score and total reported practices score for their mothers  $p = < 0.001^{**}$  .

It was observed from this **table (7)** that there was statistical significant relation between educational level , family relation ,place of residence, monthly income and mothers occupation  $p = 0.001^{*}$ , and Total Knowledge of Studied mothers regarding congenital hypothyroidism. And no statistical significant relation between age and total knowledge scores  $p = 0.250$

It was observed from this **table (8)** that there was statistical significant relation between educational level , family relation ,place of residence, monthly income and mothers occupation  $p = 0.001^{*}$ , and Total reported practice of Studied mothers regarding congenital hypothyroidism. And no statistical significant relation between age and total knowledge  $p = 0.066$

It was observed from this **table (9)** shows that there was statistical significant relation between educational level , family relation ,place of residence, monthly income and mothers occupation  $p = 0.001^{*}$ , and Total attitude of Studied mothers regarding congenital hypothyroidism. And no statistical significant relation between age and total attitude scores  $p = 0.334$

**Table (10)** illustrates that there was positive relation between mothers total knowledge , total

attitude and total reported practice regarding congenital hypothyroidism. with statistical significance difference between mothers knowledge , attitude and practice regarding to congenital hypothyroidism. ( $p < 0.001$ ).

**Table (1):Frequency Distribution of the Studied mothers regarding Demographic Characteristics (n=88).**

Demographic Characteristics	No	%
<b>Age groups (in years)</b>		
<20	18	20.4
20 - <30	32	36.4
30 -<40	30	34.1
≥40	8	9.1
<b>Mean ± SD =</b>	<b>33.2 ± 4.73</b>	
<b>Place of residence</b>		
Urban	55	62.5
Rural	33	37.5
<b>level of education</b>		
Read and write	8	9.1
Basic education	44	50.0
Secondary education	25	28.4
University or more	11	12.5
<b>Relationship between spouses</b>		
Yes	45	51.2
No	43	48.8
<b>If yes, what is the degree of family relation with their husband(n=45)</b>		
relation to the first degree	65	73.8
relation to the second degree	23	26.2

**Table (2):** Percentage distribution of mothers regarding previous pregnancy and birth data (n=88).

Item	No.	%
<b>Number of pregnancies</b>		
Once	7	7.9
two	43	48.8
three	33	37.6
more than three	5	5.7
<b>Number of abortion</b>		
Once	8	9.2
two	2	2.2
three	5	5.7
No abortion	73	82.9
<b>- Number of delivery</b>		
Once	18	20.5
two	45	51.2
three	13	14.7
more than three	12	13.6
<b>Type of delivery</b>		

Natural	25	28.4
Caesarian section	55	62.5
Forceps or ventous	8	9.1
<b>Rh Factor</b>		
Positive	12	13.7
Negative	76	86.3
<b>Follow-up for the last pregnancy</b>		
Yes	55	62.5
No	33	37.5
<b>If yes, where did you follow (n=55)</b>		
Gynecologist doctor	39	71.0
General practitioner doctor	1	1.8
Health unit	5	9.1
Nurse	10	18.1
<b>Received health education during the last pregnancy for congenital Hypothyroidism and heel test analysis?</b>		
Yes	8	9.1
No	80	90.9
<b>If yes, the place where received health education?(n=8)</b>		
The doctor	1	12.5
The nurse	5	62.5
Educated Health Unit	2	25.0
TV	0	0.0
Social media	0	0.0
<b>**Medical tests you have performed during the last pregnancy:</b>		
Analysis of viruses and genes	25	28.4
Chest X rays	15	17.1
Analysis RH, sytoplasmosis	80	90.9
A complete blood image	75	85.2
<b>Suffer from chronic diseases</b>		
Heart disease	0	0.0
Diabetes	25	28.4
Rheumatism	0	0.0
Liver diseases	1	1.1
Kidney diseases	0	0.0
Tumors	0	0.0
Blood diseases	3	3.5
Diseases of the gland	4	4.5
There no diseases	55	62.5
<b>Family member suffers from congenital hypothyroidism?</b>		
Yes	5	5.6
no	83	94.4

Mothers ,friends and grandmothers , grandfathers and mother-in-law\*

**Regarding to research question Q1: What are mothers' levels of knowledge about congenital hypothyroidism?**

**Table (3): Frequency Distribution of the mothers knowledge regarding congenital hypothyroidism? (n=88)**

Item	Mothers knowledge					
	Correct		Incorrect		Don't know	
	No	%	No	%	No	%
<b>Mothers knowledge about congenital hypothyroidism</b>						
Meaning of congenital hypothyroidism	10	11.3	55	62.5	23	26.2
Causes of congenital hypothyroidism	15	17.1	60	68.2	13	14.7
Symptom of congenital hypothyroidism	18	20.5	50	56.8	20	22.7
Types of congenital hypothyroidism	14	15.9	54	61.4	20	22.7
Diagnosis of congenital hypothyroidism	20	22.7	45	51.1	23	26.2
Treatment of congenital hypothyroidism	15	17.1	55	62.4	18	20.5
Complication of congenital hypothyroidism	25	28.5	50	56.8	13	14.7
Treatment is available for thyroid hormone deficiency	40	45.4	48	54.6	0	0.0
The doctor determine the dose of treatment required	45	51.1	43	48.9	0	0.0
know how to calculate the dosage of a drug for a child with congenital hypothyroidism	10	11.3	55	62.5	23	26.2
child's test analysis followed to determine the dose of treatment required	20	22.7	45	51.1	23	26.2
The required tests to ascertain the dosage of the medicine required	15	17.1	60	68.2	13	14.7

**Regarding to research question Q 2: - Mothers' attitudes about congenital hypothyroidism?**

**Table (4 ) : Mothers' attitude towards congenital hypothyroidism of their children (n=88)**

Mothers attitude regarding congenital hypothyroidism	Agree		Natural		Disagree	
	No	%	No	%	No	%
Think the thyroid screening program is useful for newborn babies	45	51.1	43	48.9	0	0.0
Think the program for thyroid screening is harmful to newborn babies	0	0.0	38	43.2	50	56.8
Think that the thyroid screening program is useful if it is to prevent congenital hypothyroidism	40	45.4	48	54.6	0	0.0
Think neonatal screening is important if your child looks healthy. Is newborn screening still necessary	55	62.5	23	26.2	10	11.3
Think that screening newborns will make you feel guilty if your child is found to have congenital hypothyroidism	48	54.6	40	45.4	0	0.0
Think the survey program for newborn babies is ethically justified	25	28.5	50	56.8	13	14.7
Think the new screening program is useful even if the disease does not improve and helps you decide to get more children	43	48.9	45	51.1	0	0.0
That giving the child treatment daily and regularly is useful for the child	88	100.0	0	0.0	0	0.0
Think that following up on a child with congenital hypothyroidism with a doctor is always useful for the child	48	54.6	40	45.4	0	0.0
Think that the made of laboratory tests for the child to make sure that his condition is useful for the child	88	100.0	0	0.0	0	0.0
Think that increasing your awareness about hypothyroidism is useful for dealing with a child	40	45.4	48	54.6	0	0.0
Think that follow-up development of a child with congenital hypothyroidism is useful	45	51.1	43	48.9	0	0.0



**Part III: Studied Sample' reported practices regarding congenital hypothyroidism**

**Regarding to research question:** What are mothers' reported practices dealing with congenital hypothyroidism for their infants?

**Table (5): Studied mothers reported practice regarding congenital hypothyroidism (n=88)**

Item	Mothers reported practice					
	Done		Not done		Don't know	
	No	%	No	%	No	%
<b>Mother reported practice regarding congenital hypothyroidism</b>						
1- you giving treatment to the child in the specific formula every day	55	62.5	23	26.2	10	11.3
2- doing spacing between the time of treatment and the time you give the child's nutritional supplements	40	45.4	48	54.6	0	0.0
3- give a double dose of treatment if you forgot to give it a day	0	0.0	88	100.0	0	0.0
4- you sure of the expire date of the treatment before giving it to the child	10	11.4	50	56.8	28	31.8
5- you making a written schedule to make sure you give the child treatment every day	0	0.0	88	100.0	0	0.0
6- you doing a follow up of the child's IV tests to make sure of the correct treatment dose	0	0.0	50	56.8	38	43.2
7- you visit the doctor every time	55	62.5	23	26.2	10	11.3
8- you give the child compulsory vaccinations according to the schedule in the specific referent	0	0.0	88	100.0	0	0.0

**Table (6): Correlation between mothers total reported practice , total attitude and total knowledge regarding congenital hypothyroidism (n=88)**

Items	Mothers	
	R	p
Total reported practice score	0.397	<0.01**
Total knowledge score	0.841	<0.01**
Total attitude score	0.561	<0.01**

**Table (7): Relation between mothers total Knowledge scores and Demographic characteristics regarding congenital hypothyroidism. (n=88)**

Demographic data		Total Knowledge scores			T-test	P-value
		Mean	±	SD		
Age	<20	12.833	±	4.665	1.396	0.250
	20 -<30	6.077	±	5.491		
	30 -<40	4.667	±	6.742		
	≥40	5.076	±	6.681		
Educational level	Read and write	1.700	±	2.557	24.710	<0.001*
	Basic education	3.923	±	4.569		
	Secondary education	8.833	±	7.388		
	University or more	17.308	±	6.562		
Family relation for their husband	Yes	8.755	±	7.288	23.611	<0.001*
	No	10.207	±	8.577		
Place of residence	Urban	11.733	±	5.664	23.612	<0.001*
	Rural	7.079	±	6.591		
Monthly Income	Enough	8.647	±	6.822	24.820	<0.001*
	Not enough	5.456	±	7.691		
Mothers occupation	Employee	5.600	±	8.547	22.910	<0.001*
	Housewife	7.823	±	5.699		

**Table (8): Relation between mothers ' Total reported Practices scores and Demographic Characteristics about congenital hypothyroidism. (n=88)**

Demographic data		Mothers reported Practices scores			T-test	P-value
		Mean	±	SD		
Age	<20	1.333	±	2.066	4.302	0.066*
	20 - <30	2.231	±	4.475		
	30- <40	6.744	±	7.322		
	≥40	4.642	±	6.922		
Educational level	Read and write	8.462	±	7.455	11.469	<0.001*
	Basic education	9.633	±	7.752		
	Secondary education	6.659	±	8.551		
	University or more	5.077	±	6.551		
Family relation for their husband	Yes	7.079	±	6.622	20.511	<0.001*
	No	8.744	±	7.222		
Place of residence	Urban	10.711	±	9.655	21.611	<0.001*
	Rural	8.079	±	8.591		
Monthly Income	Enough	9.647	±	9.822	22.720	<0.001*
	Not enough	8.456	±	8.691		
Mothers occupation	Employee	9.631	±	8.545	21.820	<0.001*
	Housewife	8.811	±	8.422		

**Table (9): Relation between Total attitude and Demographic characteristics for mothers regarding congenital hypothyroidism. (n=88)**

Demographic data		Mothers total Attitude scores			T-test	P-value
		Mean	±	SD		
Age	<20	12.833	±	4.665	1.396	0.334
	20 -<30	6.077	±	5.491		
	30- <40	4.667	±	6.742		
	≥40	5.076	±	6.681		
Educational level	Read and write	1.700	±	2.557	24.710	<0.001*
	Basic education	3.923	±	4.569		
	Secondary education	8.833	±	7.388		
	University or more	17.308	±	6.562		
Family relation for their husband	Yes	8.755	±	7.288	23.611	<0.001*
	No	10.207	±	8.577		
Place of residence	Urban	11.733	±	5.664	23.612	<0.001*
	Rural	7.079	±	6.591		
Monthly Income	Enough	8.647	±	6.822	24.820	<0.001*
	Not enough	5.456	±	7.691		
Mothers occupation	Employee	5.600	±	8.547	22.910	<0.001*
	Housewife	7.823	±	5.699		

**Table (10): Relation between Total Scores of Knowledge , total attitude and Total Scores of reported Practice for mothers regarding congenital hypothyroidism. (n=88)**

Item	Total reported Practice	
	R	p-value
Total Knowledge	0.322	<0.001
Total attitude	0.465	<0.001

## DISCUSSION

### Mother's Awareness Regarding Their Infants Suffering From Congenital Hypothyroidism

According to the demographic characteristics of the mothers, the current results revealed that, one third of them age 20<30 years, with mean age of  $33.2 \pm 4.73$ . This result was in the same line with **Olney et al (2019)** the study conducted in Pakistan about "Prevalence of congenital hypothyroidism—current trends and future directions" and found that, 38% of the study sample the age 20< 35 years, the mean age of  $34.3 \pm 4.93$ .

Regarding the mothers place of residence, more than two thirds of them live in urban area, Also, regarding to mothers level of education the more than half of them had basic education. This result was in the same line with **LaFranchi, et al. (2019)**. the study conducted in Franca about "Clinical features and detection of congenital hypothyroidism" and found that, 65% of study sample live in urban area.

The study conducted in Pakistan about "Newborn screening in Pakistan—lessons from a hospital-based congenital hypothyroidism screening programmer". And found that, 53% of study sample the relationship between spouses and the. From the investigator point of view, many studies have shown that a Congenital Hypothyroidism is caused by relationship between spouses.

Regarding to mothers family income, the majority of them the family income not enough the daily needs. This result was in the same line with **Chen et al. (2019)**. The study conducted in Asian about "Epidemiology and clinical characteristics of congenital hypothyroidism in an Asian population: a nationwide population-based study" and found that, the majority of them the family income not enough the daily needs. From the investigator point of view, the high standard of living in Egypt leads to insufficient monthly income for family requirements

Regarding to mothers occupation, the current study revealed that, more than half of them were employee, This result was in the same line with **Padilla, and Therrell, (2019)** the

study conducted in Asia about "Consolidating newborn screening efforts in the Asia Pacific region." Found that, more than half of mothers were employee. From the investigator point of view, the high standard of living in Egypt, it was necessary for mothers to work to participate in the cost of living.

Regarding mothers previous pregnancy and birth data, less than half of them the two number of pregnancy, the majority of them no abortion before, more than half of them two number of birth, more than two third of them the types of birth by Caesarian section, Also, the majority of them negative Rh Factor, less than two third of them they were follow-up for the last pregnancy, About two fifth of them go to the gynecological doctor, while, the majority of them not received any health education about congenital hypothyroidism, the majority of them perform analysis RH, cytoplasmatic, complete blood image. Also, less than two third of them not complain any chronic diseases and the majority of them no family history of congenital hypothyroidism. This result was in the same line with **Vanderpump(2018)** the study conducted in Turkey about "The epidemiology of thyroid disease." and found that, 50% of mothers they had two number of pregnancy, 70% of them the type of birth by caesarian section and the majority of them not receive any educational program about congenital hypothyroidism

### Regarding the mother knowledge about congenital hypothyroidism

The current study revealed that, more than two thirds of them incorrect knowledge about causes of congenital hypothyroidism and the required tests to ascertain the dosage of the medicine required, Also, less than two third of them incorrect knowledge about meaning of congenital hypothyroidism, treatment of congenital hypothyroidism and how to calculate the dosage of a drug for a child with congenital hypothyroidism. This result was in the same line with **Vulsma et al (2020)** the study conducted England about "Maternal-fetal transfer of thyroxine in congenital hypothyroidism due to a total organification defect or thyroid agenesis" and found that, 70% of study sample incorrect

knowledge about causes of congenital hypothyroidism and the required tests to ascertain the dosage of the medicine required, Also, 65% of study sample incorrect knowledge about meaning of congenital hypothyroidism, treatment of congenital hypothyroidism and how to calculate the dosage of a drug for a child with congenital hypothyroidism. From the investigator point of view, most of the mothers did not receive any health education program about congenital hypothyroidism, so most of their incorrect knowledge.

Regarding the mother knowledge about congenital hypothyroidism, the current study revealed that, more than half of them correct knowledge about the doctor determine the dose of treatment required and less than half of them correct knowledge about treatment is available for thyroid hormone deficiency. This result was in the same line with, **Büyükgebiz. (2019)** the study conducted in Iran about "Newborn screening for congenital hypothyroidism." And found that, 50% of the study sample correct knowledge about the doctor determine the dose of treatment required and 45% of the study sample correct knowledge about treatment is available for thyroid hormone deficiency. From the investigator point of view, the majority of mothers need participate the health education program about congenital hypothyroidism to improve knowledge about care for their children.

Regarding mothers total knowledge regarding congenital hypothyroidism, the current study revealed that, more than half of mothers had average knowledge about congenital hypothyroidism, while, one thirds of them had poor knowledge and one fourth of them good knowledge about congenital hypothyroidism. This result disagree with **Fisher et al (2020)**. the study conducted in North American about "Screening for congenital hypothyroidism: results of screening one million North American infants." and found that, the majority of the study sample good knowledge about congenital hypothyroidism. From the investigator point of view, the difference between the results is due to the different location of the research and the difference in the level of health services between the two countries.

### **Regarding the mothers attitudes towards their children suffering from congenital hypothyroidism**

The current study revealed that, the majority of mother sometimes attitude regarding do you think that giving the child treatment daily and regularly is useful for the child, also, less than two thirds of them sometimes attitude regarding do you think neonatal screening is very important if your child looks healthy. This result was in the same line with, **Harris and, Pass (2019)**. the study conducted in New York about "Increase in congenital hypothyroidism in New York State and in the United States." And found that, the 90% of mother sometimes attitude regarding do you think that giving the child treatment daily and regularly is useful for the child, also, 60% of them sometimes attitude regarding, do you think neonatal screening is important if your child looks healthy. from the investigator point of view, most mothers are keen to give their children treatment on a regular basis to maintain their health.

Regarding the mothers attitudes towards their children suffering from congenital hypothyroidism, the current study revealed that, more than half of mothers always attitude regarding do you think the survey program for newborn babies is ethically justified, do you think that the thyroid screening program is useful if it is to prevent congenital hypothyroidism and do you think that increasing your awareness of hypothyroidism is useful for dealing with a child. This result was in the same line with, **Banta-Wright and, Steiner (2019)**. The study conducted in Landan about "Tandem mass spectrometry in newborn screening: a primer for neonatal and perinatal nurses" and found that, 60% of mothers always attitude regarding do you think the survey program for newborn babies is ethically justified, do you think that the thyroid screening program is useful if it is to prevent congenital hypothyroidism and do you think that increasing your awareness of hypothyroidism is useful for dealing with a child. From the investigator point of view, most mothers are always interested in checking the thyroid gland for their children to maintain the health of their children.

Regarding the mothers attitudes towards their children suffering from congenital hypothyroidism, the current study revealed that , more than half of them never attitude regarding do you think the program for thyroid screening is harmful to newborn babies . This result was in the same line with **Malik and , Butt (2019)** the study conducted in Pakistan about . “Is delayed diagnosis of hypothyroidism still a problem in Faisalabad, Pakistan.” And found that , 60% of study sample never attitude regarding do you think the program for thyroid screening is harmful to newborn babies. From the investigator point of view , most mothers encourage thyroid screening programs for their children to check on their health.

#### **Regarding the mothers reported practice regarding congenital hypothyroidism**

The current study revealed that , the majority of mothers not done practice regarding give a double dose of treatment if you forgot to give it a day and you making a written schedule to make sure you give the child treatment every day , you give the child compulsory vaccinations according to the schedule in the specific referent. . This result was in the same line with **Hasan et al ( 2018)** . the study conducted in Bangladesh about . “Newborn screening in Bangladesh. “ and found that , 100% of them not done practice regarding give a double dose of treatment if you forgot to give it a day and you making a written schedule to make sure you give the child treatment every day , you give the child compulsory vaccinations according to the schedule in the specific referent. From the investigator point of view, most mothers did not give double doses of treatment to their children for fear of complications, and most of them were interested in giving vaccinations on time in order to preserve the health status of their children

Regarding the mothers reported practice regarding congenital hypothyroidism , the current study revealed that , less than two thirds of them done practice regarding giving treatment to the child in the specific formula every day and mothers visit the doctor for follow-up at the specified times. This result was in the same line with **Padilla et al (2020)** . the study conducted in

Singapore about “Newborn screening progress in developing countries—overcoming internal barriers” and found that ,65% of the study sample done practice regarding giving treatment to the child in the specific formula every day and you visit the doctor every time. From the investigator point of view , some mothers had a good practice in the way of giving treatment, because the mother feared for her child, in addition to that she was interested in visiting the doctor periodically to follow up and check on the health status of the child .

Regarding the mothers reported practice regarding congenital hypothyroidism , the current study revealed that , less than half of them don't know about doing a follow up of the child's IV tests to make sure of the correct treatment dose. This result was in the same line with **Kaur et al.(2019)** . the study conducted in Indian about “Preliminary report on neonatal screening for congenital hypothyroidism, congenital adrenal hyperplasia and glucose-6-phosphate dehydrogenase deficiency” and found that , 46 % of study sample don't know about doing a follow up of the child's IV tests to make sure of the correct treatment dose. From the investigator point of view , most of the mothers did not have the skills to give treatment through canola, but they depended on the nurses to give the treatment to their children.

Regarding the mothers total reported practice regarding congenital hypothyroidism , the current study revealed that, more than half of mothers had not done practices for child with congenital hypothyroidism. While, about two fifth of them had correctly done practice. This result was in the same line with **Hashemipour , et al.(2020)** the study conducted in Iran about . “Permanent and transient congenital hypothyroidism in Isfahan–Iran” and found that, 60% of mothers had not done practices for child with congenital hypothyroidism. While, 40% of them had correctly done practice. From the investigator point of view , most of the mothers did not participate in training courses or seminars related to the disease, so their practices and knowledge were insufficient to care for their children.

## SUMMARY

CH must be diagnosed promptly because delay in treatment can lead to irreversible neurological deficits. Before the newborn screening program, CH was one of the most common preventable causes of intellectual disability. Newborn screening (NBS) programs have led to earlier diagnosis and treatment of CH, resulting in improved neurodevelopmental outcomes. **Kollati, et al (2020)**.

Neonates with congenital hypothyroidism are often asymptomatic at birth and detected by newborn screening (NBS). NBS is obtained via heel prick on dried whole blood spot samples on filter paper cards. NBS for CH is routine in most countries worldwide. Methods for NBS detection and criteria for CH diagnosis vary throughout the United States and other countries. The priority of the NBS is the early detection of primary CH. The most specific test for detecting primary CH is a TSH measurement, while the T4 test is more sensitive as it includes babies with rare hypothalamic-pituitary-hypothyroidism.

### **Büyükgebiz , (2019)**

Regarding the mothers relation between mothers total knowledge and demographic characteristics regarding congenital hypothyroidism, the current study revealed that, that there was statistical significant relation between educational level , family relation ,place of residence, monthly income and mothers occupation  $p= 0.001^*$ , and total Knowledge. And no statistical significant relation between age and total knowledge  $p=0.250$  . This result was in the same line with **Afroze et al (2018)** ,found that revealed that, that there was statistical significant relation between educational level , family relation ,place of residence, monthly income and mothers occupation  $p= 0.001^*$ , and total Knowledge. And no statistical significant relation between age and total knowledge  $p=0.250$ . From the investigator point of view , there is a definite relationship between the mother's education level, the higher the mother's education level, the more information and practice she has towards caring for her children.

Regarding the mothers relation between total reported Practices and their demographic characteristics about congenital hypothyroidism , that there was statistical significant relation between educational level , family relation ,place of residence, monthly income and mothers occupation  $p= 0.001^*$ , and total reported practice of studied mothers. And no statistical significant relation between age and total knowledge  $p=0.066$ . This result was in the same line with **LaFranchi et al (2019)**. And found that , that there was statistical significant relation between educational level , family relation ,place of residence, monthly income and mothers occupation  $p= 0.001^*$ , and total reported practice of studied mothers. And no statistical significant relation between age and total knowledge  $p=0.066$ . From the investigator point of view , the high level of education of the mother and her going out to work increases her knowledge of illness, which increases her correct practice of taking care of her child.

Regarding the mothers relation between total attitude and demographic characteristics for mothers regarding congenital hypothyroidism. The current study revealed that, that there was statistical significant relation between educational level , family relation ,place of residence, monthly income and mothers occupation  $p= 0.001^*$ , and total attitude of studied mothers. and no statistical significant relation between age and total knowledge  $p=0.334$ . This result was in the same line with **Rose , and Brown (2019)**, and found that, that there was statistical significant relation between educational level , family relation ,place of residence, monthly income and mothers occupation  $p= 0.001^*$ , and total attitude of studied mothers. and no statistical significant relation between age and total knowledge  $p=0.334$ . From the investigator point of view , the high level of education of the mother led to an improvement in her attitudes towards taking care of their children

Regarding the mothers correlation between total knowledge, total reported Practice and demographic characteristics for mothers regarding congenital hypothyroidism , the current study revealed that , that there was a highly

statistically significant correlation between total knowledge and total reported practices regarding mothers' age and educational levels  $p = < 0.01^{**}$ . This result was in the same line with **Olney et al (2019)** and found that, there was a highly statistically significant correlation between total knowledge and total reported practices regarding mothers' age and educational levels  $p = < 0.01^{**}$ . From the investigator point of view, the more information mothers have, the more skills they will have towards taking care of their children.

Regarding the moth relation between total scores of knowledge, total attitude and Total scores of reported Practice for mothers regarding congenital hypothyroidism, the current study revealed that, that there was positive relation between mothers total knowledge, total attitude and total reported practice regarding congenital hypothyroidism. with statistical significance difference between mothers knowledge, attitude and practice regarding to congenital hypothyroidism. ( $p < 0.001$ ). This result was in the same line with **Virtanen, (2021)**, and found that, that there was positive relation between mothers total knowledge, total attitude and total reported practice regarding congenital hypothyroidism. with statistical significance difference between mothers knowledge, attitude and practice regarding to congenital hypothyroidism. ( $p < 0.001$ ). From the investigator point of view, the more the mother's knowledge increased, the higher the level of correct practices in caring for their children, as well as the increase in the mother's attitudes towards their children.

## CONCLUSION

**It concluded that**, Illustrated the more than half of mothers had average total knowledge regarding congenital hypothyroidism, one third of mothers had poor knowledge, and one quarters of them had good total knowledge regarding congenital hypothyroidism, that more than half of mothers positive attitude regarding congenital hypothyroidism. While, less than half of them negative attitude regarding congenital hypothyroidism. that more than half of mothers had not done practices for infant with congenital hypothyroidism. While, About two fifth of them

had correctly done practice. In addition, there were a reflected that there was a highly statistically significant relation between total knowledge score, total attitude score and total reported practices score for their mothers  $p = < 0.001^{**}$

## RECOMMENDATIONS

**On the light of the results of the current study findings the following recommendations are suggested:**

- Disseminating health education booklets to increase mothers knowledge regarding congenital hypothyroidism at outpatient clinics.
- Developing health educational programs that would help mothers to improve knowledge, practice and attitude regarding child with congenital hypothyroidism
- Encourage mothers to make group discussion regarding the child with congenital hypothyroidism to exchange their experience about the disease under observation from community health nurse.
- Further research on a large sample size and other setting is recommende

## REFERENCES

- Abdelmuktader, A., (2013).** Risk factors for congenital hypothyroidism in Egypt: Results of a population case-control study, 203;210.
- Afroze B, Humayun KN, Qadir M.** Newborn screening in Pakistan—lessons from a hospital-based congenital hypothyroidism screening programmer. *Ann Acad Med Singapore* 2018;37(12 Suppl):114–3.
- Alabama Department of Public Health - Newborn Screening, (2018).** A parent's guide to understanding congenital hypothyroidism, *Arch Intern Med.* 91 (6): 1203-1209, available at: [https://www.childrensal.org/workfiles/clinical\\_services/endocrine/parents\\_guide.pdf](https://www.childrensal.org/workfiles/clinical_services/endocrine/parents_guide.pdf)
- Banta-Wright SA, Steiner RD.** Tandem mass spectrometry in newborn screening: a primer for neonatal and perinatal nurses. *J Perinat Neonatal Nurs* 2019;18(1):41–60.
- Büyükgebiz A.** Newborn screening for congenital hypothyroidism. *J Pediatr Endocrinol Metab* 2019;19(11):1291–8.

- Büyükgebiz A.** Newborn screening for congenital hypothyroidism. *J Clin Res Pediatr Endocrinol.* 2019;5 Suppl 1:8-12. [PMC free article] [PubMed]
- Chen C-Y, Lee K-T, Lee CT-C et al.** . Epidemiology and clinical characteristics of congenital hypothyroidism in an Asian population: a nationwide population-based study. *J Epidemiol* 2020;23(2):85.
- Fisher DA, Dussault JH, Foley TP et al.** . Screening for congenital hypothyroidism: results of screening one million North American infants. *J Pediatr* 2020;94(5):700–5.
- Harris KB, Pass KA.** Increase in congenital hypothyroidism in New York State and in the United States. *Mol Genet Metab* 2019;91(3):268–77.
- Hasan M, Nahar N, Moslem F et al.** . Newborn screening in Bangladesh. *Ann Acad Med Singapore* 2018;37(12 Suppl):111–113.
- Hashemipour M, Hovsepian S, Kelishadi R et al.** . Permanent and transient congenital hypothyroidism in Isfahan–Iran. *J Med Screen* 2019;16(1):11–16.
- Hashemipour M, Hovsepian S,(2018):** Etiology of congenital hypothyroidism in Isfahan: Does it different? *Adv Biomed Res*;3:21.
- Kaur G, Srivastav J, Jain S 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* 2019;77(9):969–973.
- Kollati, Y., Akella, R.D., Naushad, S.M., Thalla, M., Reddy, G.B. Dirisala, V.R., (2020).** polymorphism is a genetic risk factor for congenital hypothyroidism. *3 Biotech.* 10(6):285.
- LaFranchi S, Kirkland J, Garcia-Prats J et al.** . Clinical features and detection of congenital hypothyroidism. 2019. <https://www.uptodate.com/contents/clinical-features-and-detection-of-congenital-hypothyroidism>.
- Malik BA, Butt MA.** Is delayed diagnosis of hypothyroidism still a problem in Faisalabad, Pakistan. *J Pak Med Assoc* 2018;58(10):545–9.
- Olney RS, Grosse SD, Vogt RF.** Prevalence of congenital hypothyroidism—current trends and future directions: workshop summary. *Pediatrics* 2019;125(Suppl 2):S31–6.
- Padilla CD, Krotoski D, Therrell BL.** Newborn screening progress in developing countries—overcoming internal barriers. *Semin Perinatol* 2020;34(2):145–55.
- Padilla CD, Therrell BL Jr.** Consolidating newborn screening efforts in the Asia Pacific region. *J Community Genet* 2019;3(1):35–45.
- Poornima P., and Padmaja A., (2018).**A Study To Assess The Effectiveness of Structured Teaching Programme on Knowledge Regarding Prevention of Iodine Deficiency Disorder Among Mother's Under Five Children At Selected Anganwadi Center, Tirupati. *Journal of Nursing and Health, Volume 7, Issue 4, PP 84-89,* available at: <https://www.iosrjournals.org/iosr-jnhhs/papers/vol7-issue4/Version-10/K0704108489.pdf>
- Puryear& Tonniges.( 2016):** Prevalence of congenital hypothyroidism—current trends and future directions summary for community *Pediatrics ;125(Supply 2):S31*
- Rose SR, Brown RS.** Update of newborn screening and therapy for congenital hypothyroidism. *Pediatrics* 2019;117(6):2290–303.
- Santos L.N., Oliveira C.L., and Dantas C.A., (2021).** Adhesion to treatment by children with congenital hypothyroidism: Knowledge of caregivers in Bahia state, Brazil. *Revista paulista de pediatria, 39,* available at: <https://www.scielo.br/j/rpp/a/t6JTWWCzNWLZrSbLvd9HhQK/?lang=en&format=html>
- Vanderpump MP.** The epidemiology of thyroid disease. *Br Med Bull* 2018;99(1):39–51.
- Venugopalan L., Rajan A., Prasad H.K., Sankaran A., Gnanabalan Murugesan G., and Ramanathan S.,(2021).** Impact of maternal thyroid disease on neonatal thyroid status. *Journal of Pediatric Endocrinology and Metabolism, vol. 34, no. 2, pp. 237-241,* available at: <https://doi.org/10.1515/jpem-2021-0349>
- Vigone MC, Frenna M. (2017):** Evolution of thyroid function in preterm infants detected by screening for congenital hypothyroidism. *J Pediatric;164(6):1296–1302*
- Virtanen M.** Manifestations of congenital hypothyroidism during the 1st week of life. *Eur J Pediatr*2021;147(3):270–274.



**Hashemipour M, Hovsepian S, Kelishadi R et al.** . Permanent and transient congenital hypothyroidism in Isfahan–Iran. *J Med Screen* 2019;16(1):11–16.

**Hashemipour M, Hovsepian S,(2018):** Etiology of congenital hypothyroidism in Isfahan: Does it differ? *Adv Biomed Res*;3:21.

**Malik BA, Butt MA.** Is delayed diagnosis of hypothyroidism still a problem in Faisalabad, Pakistan. *J Pak Med Assoc* 2018;58(10):545–9.