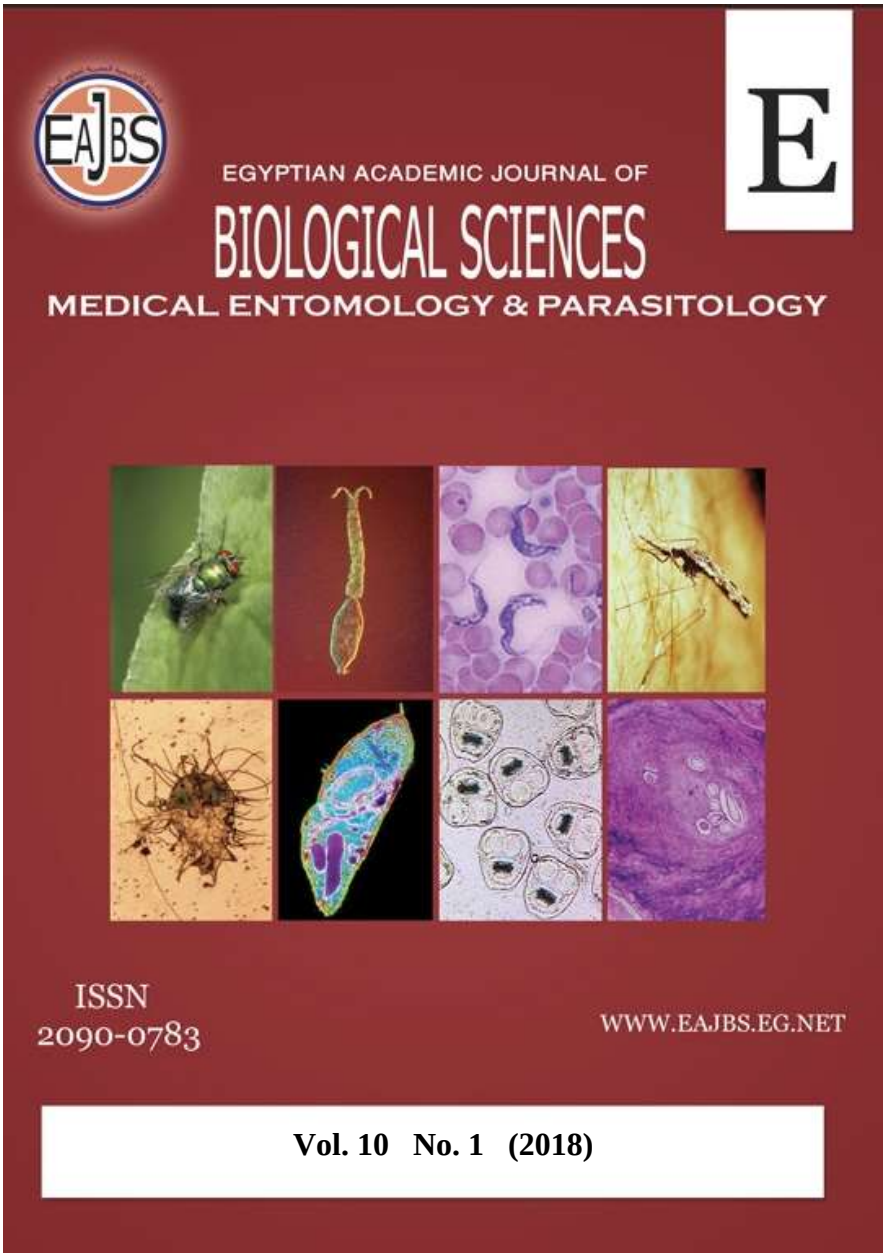

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Survey the Prevalence Level of Congenital Hypothyroidism Kinds (Transient and Permanent) and its Related Factors in Children of Kurdistan Provinces in 2005 to 2011

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ABSTRACT

Introduction: Congenital hypothyroidism (CH) is one of the most common endocrine and metabolism diseases and also one of the common curable factors of physical growth and mental disabilities disorders. The prevalence of congenital hypothyroidism is 1 in 3000 to 1 in 4000 of live births in the world and about 1 in 670 live births in Iran. This situation may be transient or permanent. Postponing diagnosis and treatment of congenital hypothyroidism even for 3 months after birth lead to loss of IQ by 50 percent. However, the diagnosis and treatment of this disease is very easy. The purpose of current study is to survey the prevalence level of congenital hypothyroidism kinds and related factors in children of Kurdistan Provinces in 2005 to 2011 and acquiring the information necessary to chart the disease and designing preventive measures at the first and second levels.

Materials and Methods: This is a descriptive-analytic study and that was conducted cross-sectional on all neonates with congenital hypothyroidism in Kurdistan province during 2005-2007. The affected infants with congenital hypothyroidism from the cities of Kurdistan province have been selected according to the form of care for congenital hypothyroid patients who were provided by health centers of the province between 2005 and 1390. The form for all patients after initial positive screening and confirmation of diagnosis was provided and delivered to the provincial health center. After collecting data, they were analyzed by inputting into SPSS software.

Results: The number of patients was included of 279 boys (59%) and 188 girls (41%). The illness prevalence in boys, girls and total was 1 in 293, 1 in 418 and 1 in 344 in newborn infants, respectively. According to the findings, the incidence of transient congenital hypothyroidism was 1 in 446 and the prevalence of persistent type 1 in 1515 newborns. Data analysis indicated that the prevalence of congenital hypothyroidism in males was 48 percent and 1 fold and there was a significant relationship between type of hypothyroidism and gender (P = 0.000). Also according to the results of familial marriages, there is a significant relationship with the increase in chronic hypothyroidism in Kurdistan province and also there was a significant relationship between the type of hypothyroidism and parental relationship (P = 0.000).

Conclusion: The prevalence of congenital hypothyroidism in Kurdistan province is higher than the national average and multiplied by the average of countries with a screening program. Hence, this disease is of particular importance and people's awareness and the health care staffs are necessary in order to raise awareness about the irreversible complications of the disease in the absence of treatment. On the other hand, supplementary studies to clarify the relevant factors, especially iodine deficiency and family marriage, are the research priorities of the health system in the province.

INTRODUCTION

The role of the endocrine including of the thyroid gland is very important in metabolic activities of the body; and thyroid hormone is important for the normal development and development of the nervous system. In the weeks 4^{th} to 10^{th} of gestation, the thyroid gland evolves from the bucopharyanal cavity and after going through the path on the front of the neck. Disturbances in the formation or movement of the thyroid tissue can cause aplasia, dysplasia, or ectopic thyroid gland miss-placement. The embryo is able to produce a T4 hormone and a small amount of the T3 hormone up to week 12^{th} of pregnancy. The evolution of the hypothalamus system and the secretion of TSH started from 6 to 8 weeks of embryonic development and the evolution of the hypothalamic-pituitary-thyroid axis continues until the second half of pregnancy, but the linkage between the hypothalamus, the pituitary and the thyroid is not yet complete until about three months later. From the embryo to the first 2 years of life, it is essential for the central nervous system to interact with the thyroid hormone (Coakley et al., 1992; Allen and Fomenko, 2011). Diagnosis of congenital hypothyroidism in newborns is difficult because they have a natural appearance in this period. Late diagnosis and lack of treatment may lead to irreversible complications such as mental retardation and deafness (Pak, 2010; Karamizadeh et al., 2012).

Thyroid hormones play an important role in the process of differentiation and cell maturation in the nervous system. The presence of these hormones during pregnancy is essential for creating a suitable environment for the maintenance of the fetus in the mother's uterus (Lewis and Braverman, 1998). In the event of hypothyroidism in the neonatal period and its failure to diagnose or prevent the early onset of the disease in the early days of life (and at most in the first few months of life), and continued hypothyroidism, severe impairment in mental and physical development, and backward Mental disorientation and personality disorder occur, which is called congenital hypothyroidism (CH).

Children who have a low thyroid function at an older age may stop their growth suddenly. If treatment with thyroid hormones starts late, mental impairment and learning will persist forever. Therefore, the development of screening programs is necessary in all countries (Hetzel, 1989).

In the recognition of hypothyroidism, it can be said that hypothyroidism is one of the most common endocrinological diseases among children, and has two, transient and permanent forms (De Escobar and Obregan, 1993; Hallengereh, 1998). Neonatal hypothyroidism is a sporadic disease, and in very few cases familial types have been reported (Delange, 1997; Fisher, 2002). The prevalence of persistent hypothyroidism is relatively constant and ranges from 1 to 3000-4000 births (Gruters and Jenner, 2002).

The Primaryhypothyroidism is (Thyroid dysgenesis and thyroid hormone disorder) and secondary-tertiary hypothyroidism (central) (Brown, 2001). Following the elimination of iodine deficiency in Iran, neonatal hypothyroidism screening began in Tehran in March 1997 and early reports indicate a high prevalence of disease in the region (Ordookhani and Mirmiran, 2003). Also, there is a significant relationship between familial marriages and the occurrence of hypothyroidism. It is assumed that the thyroid hormone disorder, which is an autosomal recessive disease, may be affected by the high prevalence of familial marriages in the region and one of the factors of high prevalence of the disease (Hung, 2001; Ordookhani and Mirmiran, 2003). Five years after the implementation of the congenital hypothyroidism screening program and the follow-up of hypothyroid infants sufficiently, chronic and transient neonatal hypothyroidism was detected and reports suggest that the prevalence of persistent hypothyroidism in Tehran is about

2-3 times the prevalence of the disease in the world. (Ardwani et al., 2003). In Iran, 1 case of congenital hypothyroidism has been reported for each 670 births which the reason of this congenital hypothyroidism can be different. Hypothyroidism in infants and children is the factor of growth and developmental backwardness that may eventually lead to a permanent mental and motor backwardness (Bulbul et al., 2009; Ramos et al., 1998; Bradley et al., 1974). If hypothyroidism is detected and treated promptly, it can prevent brain damage and mental retardation caused by congenital hypothyroidism, as well as complications such as cardiac complications, skeletal and gastrointestinal anomalies (Sabri et al., 2006). According to the above, though, in recent years, the effects of various factors such as family marriage or residence on the type of hypothyroidism in children have been investigated, but the aim of this study was to determine the true prevalence of congenital hypothyroidism based on accurate diagnostic criteria in Kurdistan province that has not been done so far. Considering to this matter that in most cases congenital hypothyroidism has been detected for three years from the initial treatment and with clinical or laboratory examination of its permanent or transient type, the overall aim of this article is to determine the extent of these two groups (those with chronic or transient hypothyroidism) And many other factors that affect the type of children's hypothyroidism (permanent or transitory) in Kurdistan province are known.

MATERIALS AND METHODS

This study is a cross-sectional (descriptive-analytic) study. The study population of this study was all infants with neonatal hypothyroidism in Kurdistan province during 2005-2011. The method of sampling was enumeration and sample size was also consisted of all infants with congenital hypothyroidism in Kurdistan province during 2005-2011. All children born with congenital hypothyroidism in the years 2005 to 2011 were included in the study according to a country definition from Kurdistan province. The sample size was 467. Newborns with congenital hypothyroidism from cities of Kurdistan province were selected according to the form of care of congenital hypothyroid patients, which were prepared by health centers of the province between 2005 and 2011. The form for all patients after initial positive screening and confirmation of diagnosis was provided and delivered to the provincial health center. Information from this study is also derived from the extraction and analysis of the mentioned forms. Newborns with congenital hypothyroidism born in provincial cities by the end of 1390 have been tested for thyroid hormone tests after levothyroxine therapy up to the age of 3 years and have been evaluated for persistent or transient conditions. The results of this assessment by examining the information contained in the records, they were extracted. After collecting data and entering them into SPSS software, quantitative variables were described as mean and standard deviations, and qualitative variables were characterized by frequency and percentage. Then, Chi-square test was used to compare qualitative variables between the two groups.

RESULTS

Table (1): Comparison of relationship between congenital hypothyroidism and place of residence in children of Kurdistan province from 2005 to 2011

City	Type of hypothyroidism		Total
	Transition	Permanent	
Baneh	32 (78%)	9 (21%)	41 (100%)
Bijar	14 (56%)	11 (44%)	25 (100%)
Dehgolan	1 (50%)	1 (50%)	2 (100%)
Divandareh	22 (42%)	31 (58%)	53 (100%)
Sarvabad	13 (93%)	1 (7%)	14 (100%)
Saqez	93 (91%)	10 (9%)	103 (100%)
Sanandaj	108 (90%)	27 (20%)	135 (100%)
Qorveh	19 (95%)	1 (5%)	20 (100%)
Kamyaran	20 (91%)	2 (9%)	22 (100%)
Marivan	38 (73%)	14 (27%)	52 (100%)
Total	360 (100%)	107 (100%)	467 (100%)

The results of above table (1) show that more abundance of hypothyroidism type belonged to the transient or temporary type and most abundance in transient types was for Sanandaj and in permanent types was for Divandareh.

Table (2): The comparison of relationship between congenital hypothyroidism kinds and birth date of Kurdistan provinces in 2005 to 2011

Year	Kind of Hypothyroidism		Total
	Transient	Permanent	
2005	4 (78%)	5 (56%)	9 (100%)
2006	30 (66%)	15 (33%)	45 (100%)
2007	42 (80%)	11 (20%)	53 (100%)
2008	65 (82%)	31 (58%)	80 (100%)
2009	86 (78%)	24 (22%)	110 (100%)
2010	60 (74%)	22 (26%)	82 (100%)
2011	73 (82%)	15 (18%)	88 (100%)
Total	360 (77%)	107 (23%)	467 (100%)

The table 2 shows that more abundance of hypothyroidism type belonged to the transient or temporary type and most abundance of Transient types was in 2009.

Table (3): The comparison of relationship between congenital hypothyroidism kinds and children's gender of Kurdistan provinces in 2005 to 2011

Gender	Kind of Hypothyroidism		Total
	Transient	Permanent	
Male	219 (78%)	60 (22%)	279 (100%)
Female	141 (75%)	47 (25%)	188 (100%)
Total	360 (77%)	107 (23%)	467 (100%)

$x^2 = 000 \quad df = 1 \quad p = 0/000$

The analysis was conducted by Chi-square test. The above table showed that there is statistically significant (meaningful) difference between congenital hypothyroidism and gender ($p = 0/000$).

Table (4): The comparison of relationship between congenital hypothyroidism kinds and parental relationship ratio in children of Kurdistan provinces in 2005 to 2011

Parental relationship ratio	Kind of Hypothyroidism		Total
	Transient	Permanent	
No	338 (77%)	100 (23%)	438 (100%)
Yes	22 (75%)	7 (25%)	29 (100%)
Total	360 (77%)	107 (23%)	467 (100%)

$x^2 = 000 \quad df = 1 \quad p = 0/000$

The analysis was conducted by Chi-square test. The above table showed that there is statistically significant (meaningful) difference between congenital hypothyroidism and parental relationship ratio ($p = 0/000$).

DISCUSSION

In this study that was conducted on 157080 newborn babies in Kurdistan province between 2005 and 2011, 467 cases were diagnosed with congenital hypothyroidism and the incidence of congenital hypothyroidism was achievedabout 1 in 344 newborns. Also, the incidence of transient congenital hypothyroidism was 1 in 446 and the incidence of congenital hypothyroidism was 1 in 1515 newborns. The estimated incidence of congenital hypothyroidism in countries with a screening program stabilized between 1 in 3,000 and 1 in 4,000 newborns (Toublanc, 1992), according to which the prevalence in Kurdistan province is 9 to 12 times higher than the above. The incidence of neonatal hypothyroidism is various in different parts of the world, with 1 in 67 neonates born in Nigeria (Ojule and Osotimehin, 1998) 1 in 781 in Pakistan (Hall et al., 1999) and 1 in 2736 in Turkey (Yordam et al., 1995) to 1 in 10,000 in the United States of America (Roberts et al., 1997) has been reported. In Iran, according to limited studies, the incidence of congenital hypothyroidism has been reported differently, but compared with the global average. In a study done in (Erdokhani et al) in Tehran during the years 2001-2005, the prevalence of congenital hypothyroidism was reported in 914 cases (Ardwani et al., 2002). In a study conducted 1 in 1990 by Karimzadeh and Amir Hakimi in Shiraz, the prevalence of congenital hypothyroidism was reported 1 in 1433 (Karamizadeh and Amirhakimi, 1992). A study was conducted in 2002 by Hashemipour et al on 20,000 newborns in Isfahan. In this study, the prevalence of congenital hypothyroidism was 1 in 370 (Hashemipour et al., 2005). There are several reasons for the differences Statistics prevalence of CH in different parts of the world, stated (Azizi and Sheykhol-eslam, 2002) that includes a) test of T4 or TSH alone for screening b) difference metrics contract for a definite diagnosis of neonatal hypothyroidism in various studies c) iodine deficiency in some parts of the world that is of causes of hypothyroidism, especially the type of transient is known in infants d) different racial, ethnic and genetic family: for example, in Turkey prevalence of CH isreported 1 in 2943 babies, in Saudi Arabia, 1 in 2759 newborns, In Japan, 1 in 7,000 babies and in Arabs in Israel 1 in 1447 that in comparison with Jews settled in that country is more prevalent (1 in 2070 infants) (The high incidence of iodine antiseptics, especially in preterm infants, is due to the difference in the incidence of congenital

hypothyroidism) and environmental factors that are associated with increased incidence of congenital hypothyroidism in some populations. In most studies, the prevalence of illness in females is higher than males so thatin Saudi Arabia, the proportion of females to males is 8, 1 (Mikelsaar et al., 2003) in Estonia 4 to 1 (Kudrjavtseva, 1998) and in China 3 to 2 (Honarpisheh et al., 2005). But in the current study, the prevalence of congenital hypothyroidism in male infants was 41, 3, and in female infants was 39, 2 and the male-female sexual prevalence was 48, 1. In the study of Isfahan, the prevalence of dystrophy was lower than that of male (1 to 45, 1) (Hashemipour et al., 2005; Azizi and Sheykhol-eslam, 2002), which was consistent with our study, and the reason for this in the two studies may be related to a small sample size.

In our study, among 436 patients with congenital hypothyroidism, 438 parents hadrelatives with lack of kinship and 29 had parents withkinship. In a group whose parents were not related, 77% had transient hypothyroidism and 23% had permanent hypothyroidism, 75% had transient hypothyroidism and 25% had permanent hypothyroidism in a group whose parents were relatives. The results of this study showed a statistically significant difference between the type of congenital hypothyroidism and relationship, and indicate that the parent's kinship increases the permanent hypothyroidism. A study done by Ordoukhani in 2002 showed that the ratio of the chance of marital marriages in permanent hypothyroidism was P = 0.02 with 2.75, which indicated that familial marriages were a possible cause of hypothyroidism in neonates in Tehran (p. 16), which fully coincided with the results of our study. In the study of Hashemi Pour and colleagues in 2005, the relatives' relationship between normal and healthy hypothyroidism was studied. After examining the results, there was no meaningful relationship between the incidence of congenital hypothyroidism and the existence of familial marriages. While, the odds ratio of this disorder was nearly 793 in infants with close relatives of parents in the comparison to unmarried parents (Hashemipour et al., 2005).

The prevalence varies according to race and geographical area (Zhang and Cao, 1993; Rastogi and LaFranchi, 2010). In a study in New York, the incidence of congenital hypothyroidism in the Asian race was higher (1 in 1016) (Harris and Pass, 2007). In Iran, in studies carried out by Erdokhani et al in Tehran, the prevalence of congenital hypothyroidism was reported in 1 in 914 live births (Ordookhani et al., 2003). In our study, the incidence of congenital hypothyroidism varies according to the years and the cities of the place of residence, with the highest incidence related to the city of Divandareh by 96 that was 12 cases per thousand in 2011. In a study by Salmon in infants in South Khorasan, the incidence of hypothyroidism varied from 0.58 to 3.16 per 1000 live births (Namakin et al., 2012), which was consistent with our study.

After reviewing the studies and comparing the results agreeing and opposing the results of this study, it seems that the prevalence of congenital hypothyroidism due to ethnic, racial, hereditary and familial differences and environmental factors from city to city and country varies from country to country. Meanwhile, the prevalence rate in Kurdistan province is higher than the national average and multiplied by the average of countries with a fixed screening program. Also, there is a significant relationship between the sex and parents' kinship with the type of congenital hypothyroidism.

Conclusion

Postponing the diagnosis and treatment of congenital hypothyroidism, even for 3 months after birth, leads to a loss of IQ of 50%. However, due to the high prevalence of congenital hypothyroidism in Kurdistan province, and due to the economic and social consequences of the mental disability resulting from the delay in the treatment of the disease in the community, special attention is paid to the high

prevalence of congenital hypothyroidism in Kurdistan province. It is important for these patients and informing the public and health care staff to raise awareness about the irreversible complications of the disease in the event of non-treatment is necessary. In this study, there was a relationship between the parents' kinship type of hypothyroidism which is relatively high due to the relatively high proportion of family marriages, especially close family marriages, considering the role of these marriages in increasing the incidence of congenital hypothyroidism and the high prevalence of hypothyroidism Congenital in the community is necessary to develop appropriate strategies to raise awareness about the prevalence of the disease. The results also indicate a higher incidence rate than expected in some of the province's provinces, which should be considered as a means of causation.

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