

Factors Affecting Compliance to Therapy in Patients with Congenital Hypothyroidism in Sharkia Governorate, Egypt

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Received: March 26, 2017; Published: August 02, 2017

Abstract

Background: Congenital hypothyroidism (CH) is one of the most common preventable causes of mental retardation in children. Compliance to medication in patients with CH is known to improve the neurodevelopmental outcomes of CH. Compliance to therapy can be affected by multiple factors.

Aim of the work: The aim of this study is to explore compliance of the patients and/or their target families to therapy of CH, and to explore factors affecting compliance to medication in patients with CH.

Subjects and Methods: This was descriptive cross-sectional study, which was conducted in Endocrinology and Pediatric Outpatient Clinics in Sharkia Governorate health insurance center, Egypt. The study participants were 120 newborn and infant with CH and their mothers. Data were collected using multi-structured questionnaires for determining socioeconomic state, clinical picture of congenital hypothyroidism, personal, family history and Morisky Medication Adherence Scale 8 (MMAS 8) to assess patient compliance.

Results: About two third of patient families were highly compliant to therapy. Compliance to therapy was affected by multiple factors including occupational and educational levels of the parents, residence, income, social class, presence of symptoms and associated congenital anomalies. Binary logistic regression of factors affecting patient's compliance showed that the most significant factors affecting compliance were mother's education, social class and presence of symptoms at presentation.

Conclusion: Compliance to L thyroxin therapy in our patients and/or their family was found to be reasonable and affected by multiple factors namely mother's education, social class and presence of symptoms at presentation.

Keywords: Congenital Hypothyroidism; Compliance; Medication Adherence

Introduction

Congenital hypothyroidism (CH) is the most common congenital endocrine disorder and one of the most common preventable causes of mental retardation in children [1].

Congenital hypothyroidism is defined as thyroid hormone deficiency present at birth [2]. The incidence of CH was 1:3,000 to 1:4,000 live births in iodine sufficient countries [3]. In Egypt the incidence of CH during the period from January 2003 to December 2011 was 1:2941 live births in Fayoum [4].

The mainstay in the treatment of CH is early diagnosis through neonatal screening programs and thyroid hormone replacement [5]. Optimal care includes diagnosis before age 10-13 days and normalization of thyroid hormone blood levels by age 3 weeks. The goal of therapy is to achieve a growth and mental development close to the normal [6].

However, poor compliance to medication is a persistent problem across many diseases, especially chronic conditions like CH [7]. Poor compliance to thyroid hormone therapy in patients with CH is responsible for significant growth failure and psychomotor delay during childhood and a possible cause of permanent neurological deficits [8].

Poor compliance to treatment was multifactorial and complex, and includes patient-centered factors (such as age, sex, education, forgetfulness and socioeconomic factors), treatment-related factors (as treatment complexity and side effects) and healthcare system factors [9].

Aim of the Work

The aim of this work is to assess the compliance of the patients and/ or their target families to L thyroxin therapy, and to explore factors affecting compliance to medication in patients with CH.

Subjects and Methods

The study was approved by the ethical committee of the faculty of medicine, Zagazig University. This descriptive cross-sectional study was conducted from the 1st of July, 2015 till the end of December of 2015 in the Endocrinology and Pediatric Outpatient Clinics in Sharkia Governorate health insurance center.

All newborns with confirmed diagnosis of congenital hypothyroidism, total 156 patients who come to the center for treatment and follow up during the study period were studied. The neonatal TSH titer more than 10 mU/l or T4 titer less than 6.4 µg/dl was considered as CH [10]. 36 patients were excluded from the study because of incomplete medical records in the local health center or their parents refuse to give consent or lost follow up visits. 120 patients were included in the study (57 male and 63 female).

The parents of the study participants were interviewed for determining socioeconomic data, clinical picture of congenital hypothyroidism at presentation, personal and family history and Morisky Medication Adherence Scale (MMAS 8) to assess the compliance [11].

The study participants were divided in to 3 groups according to MMAS 8: Group 1 or highly compliant group (n. 72) has MMAS 8 score of = 8; group 2 or the medium compliant group (n. 14) has MMAS 8 score 6 or 7 and group 3 or the low compliant group (n. 34) has MMAS 8 score < 6.

Factors affecting compliance including parent occupation, education, residence, family income and presence of symptoms were studied.

TSH, FT3 and FT4 will be analyzed using the vitros reagent packs and the vitros calibrators on the Vitro 3600 immunodiagnostic System [12,13].

The results of investigations of the patient at diagnosis (initial TSH and T4) and during the follow up visits were reviewed from health records of the child.

Statistical analysis

Data were checked, entered and analyzed by using (SPSS version 19). Data were expressed as mean ±SD for quantitative variables, number and percentage for categorical variables. ANOVA (F test) was used to compare the means of more than 2 samples. Chi-square (X²) was used to test the association between qualitative variables. Binary logistic regression test was used to assess the effect of several potential risk factors and to adjust for underlying confounding effect of other variables. A P value of < 0.05 was considered statistically significant.

Results

Most of our patients (about two third) were highly compliant to therapy while less than one third of the patients were low compliant to therapy and only 11.7% of patients were medium compliant (Figure 1).

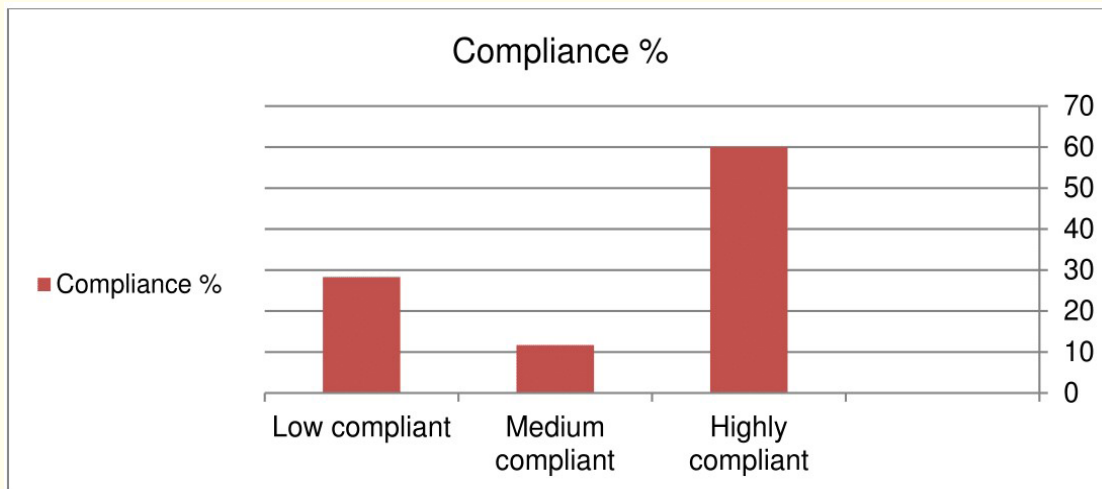


Figure 1: Percent of compliance of the patients to therapy.

There was highly statistical significant difference between high, medium and low compliant grades regarding the mean ± SD of the TSH levels during the follow up visits (P value 0.000). The higher the TSH level the lower the compliance grades (Figure 2).

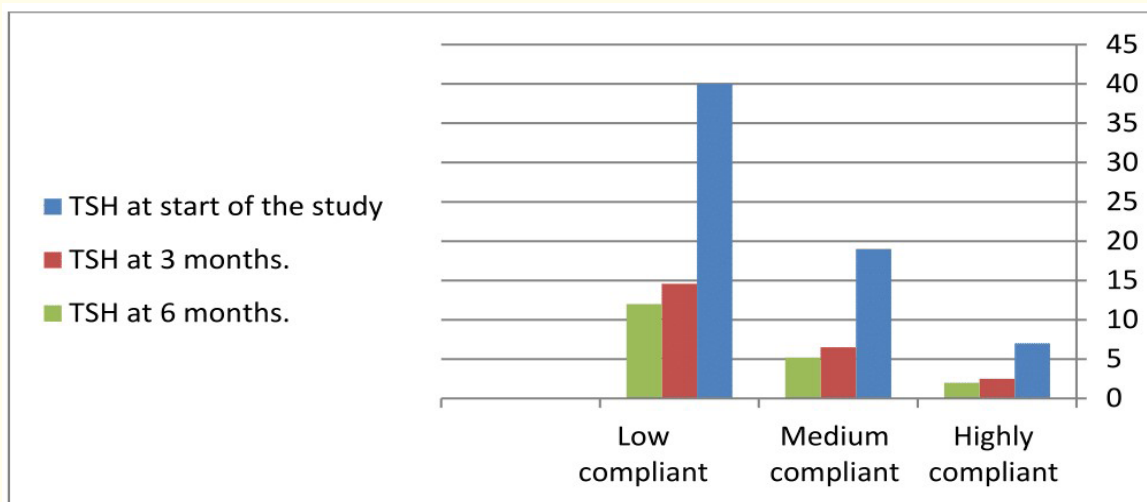


Figure 2: The median of the follow up TSH levels in different compliant grades.

According to our results the compliance to therapy was affected by: the occupational and educational levels of the parents, the higher the level of occupation and/or education of the parents the higher the compliance (Table 1A).

Table 1A: Socioeconomic factors affecting compliance.

Factor	High compliant (72)		Medium compliant (14)		Low compliant (34)		Total		X ²	P
	n	%	n	%	n	%	n	%		
Mother's Occupation										
House wife	40	55.6	9	64.3	34	100	83	69.2	31.9	0.00*
Unskilled worker	4	5.6	3	21.4	0	0	7	5.8		
Skilled worker	3	4.2	0	0	0	0	3	2.5		
Trades business	8	11.1	2	14.3	0	0	10	8.3		
Semiprofessional	11	15.3	0	0	0	0	11	9.2		
Professional	6	8.3	0	0	0	0	6	5		
Father's Occupation										
Non-working	1	1.4	0	0	3	8.8	4	3.3	20.9	0.02*
Unskilled worker	11	15.3	5	35.7	12	35.3	28	23.3		
Skilled manual worker	15	20.8	2	14.3	8	23.5	25	20.8		
Trades business	23	31.9	6	42.9	10	29.4	39	32.5		
Semiprofessional	15	20.8	1	7.1	0	0	16	13.3		
Professional	7	9.7	0	0	1	2.9	8	6.6		
Mother's Education										
Illiterate	2	2.8	2	14.3	10	29.4	14	11.7	44.7	0.00*
Read and write	2	2.8	3	21.4	6	17.6	11	9.2		
Primary	9	12.5	0	0	7	20.6	16	13.3		
Preparatory	8	11.1	3	21.4	3	8.8	14	11.7		
Secondary	15	20.8	5	35.7	5	14.7	25	20.8		
Intermediate	21	29.2	0	0	0	0	21	17.5		
University graduate	15	20.8	1	7.1	3	8.8	19	15.8		
Father's education										
Illiterate	1	1.4	0	0	8	23.6	9	7.5	32.6	0.001*
Read and write	5	6.9	5	35.7	11	32.4	21	17.5		
Primary	5	6.9	0	0	7	20.6	12	10		
Preparatory	10	13.9	4	28.6	2	5.9	16	13.3		
Secondary	24	33.3	4	28.6	4	11.8	32	27.8		
Intermediate	16	22.2	1	7.1	2	5.9	19	15.8		
University graduate	11	15.3	0	0	0	0	11	9.2		

Also the compliance was affected by the residence, income, and the social class of the parents, all the individuals living in urban areas were highly compliant to therapy and most of the individuals living in urban slum were low compliant, and the higher the income and the higher the social class the higher the grade of compliance, (Table 1B).

Table 1B: Socioeconomic factors affecting compliance.

Factor	High compliant (72)		Medium compliant (14)		Low compliant (34)		Total		X ²	P
	n	%	n	%	n	%	n	%		
Residence										
Urban slum	2	2.8	0	0	12	35.3	14	11.7	40.3	0.00*
Rural	47	65.3	14	100	22	64.7	83	69.2		
Urban	23	31.9	0	0	0	0	23	19.2		
Income										
Not sufficient	12	16.7	5	35.7	14	41.2	31	25.8	15.8	0.015*
In debt	42	52.3	9	64.3	19	55.9	70	58.3		
Just meet routine expenses	12	16.7	0	0	1	2.9	13	10.8		
Meet routine expenses and emergencies	6	8.3	0	0	0	0	6	5		
Social class										
Low	20	27.8	9	64.3	27	79.4	56	46.7	41.7	0.002*
Medium	38	52.8	5	35.7	7	20.6	50	41.7		
High	14	19.4	0	0	0	0	14	11.7		
Total	72	100	14	100	34	100	120	100		
Symptoms										
Yes	28	38.8	5	35	2	5.9	35	30	13.3	0.001*
No	44	61.1	9	64.3	32	84.1	85	70		
Congenital malformation										
Yes	9	12.5	3	21.4	18	52.9	30	25	20.3	0.000*
No	63	87.5	11	78.6	16	47.1	90	75		
Age Group										
< 2years	43	59.7	8	57.1	17	50	68	56.7	0.89	0.64
> 2 years	29	40.3	6	42.9	17	50	52	43.3		

The compliance was also affected by presence of symptoms and associated congenital malformations, families of patients who had symptoms at the time of diagnosis and those without congenital malformations were highly compliant. But there was no statistical significant difference between compliance grades and age of the patients (Table 1B).

By the use of binary logistic regression for factors affecting compliance there is only statistical significant difference between compliance grades and mothers' education, social class and presence of symptoms. But no statistically significant difference was found as regard other factors (Table 2).

Table 2: Binary logistic regression of factors affecting patient's compliance.

Factor	Beta	S.E.	Wald	P	Odds ratio
Father's occupation	17.48	9918.27	0.000	0.999	0.001 (0.007 - 5.892)
Mother's occupation	0.283	0.670	0.178	0.673	1.327 (0.357 - 4.937)
Father's education	12141.4	0.000	8.043	0.999	0.009 (0.004 - 11.860)
Mother's education	1.085	4.131	1.835	0.042*	9.065 (1.082 - 75.947)
Residence	18.921	7009.998	0.000	0.998	0.226 (1.417 - 14.283)
Income	0.457	0.654	0.489	0.484	0.002 (0.081 - 0.063)
Social class	1.049	0.321	5.291	0.015*	0.454 (0.021 - 0.282)
Symptoms	1.042	3.682	1.709	0.048*	0.000 (0.013 - 0.152)
Congenital anomalies	1.061	0.922	1.324	0.250	0.346 (0.057 - 2.11)

Discussion

The mainstay in the treatment of CH is early diagnosis and thyroid hormone replacement to prevent the negative impact on the physical and mental development [6].

This study aimed to explore compliance of the patients and/or their target families to therapy of CH, and to explore the factors affecting compliance to medication in patients with CH.

Concerning compliance to thyroid hormone therapy, most of our patients (about two thirds) are highly compliant to therapy. While less than one third of the patients are low compliant and only 11.7% of patients were of medium compliance. This is consistent with data recorded by Dabbous, *et al.* who documented that nearly quarter of cases (26.7%) were not always compliant to thyroid hormone therapy, and they concluded that the day of starting treatment with thyroid hormone and compliance to treatment are the main prognostic factors for normal child development and adult height in a study carried out in Alexandria, Egypt [14].

This is supported by our results of highly significant negative correlation between the compliance score and the TSH level.

In the present study the compliance to therapy was affected by multiple factors namely the socioeconomic state (education and occupation, social class, residence and income of the parents) and presence of symptoms at the time of diagnosis and presence of associated congenital anomalies.

This is consistent with that reported by El-Hadiyah, *et al.* who demonstrated that the reasons for poor adherence to treatment are multifaceted and complex, and include, Patient-centered factors (such as age, sex, education, and forgetfulness), therapy-related factors (such as treatment complexity and side effects), healthcare system factors (such as drug availability and accessibility to healthcare), social and economic factors (such as cost of therapy, income and social support) [9].

By the use of binary logistic regression for factors affecting compliance there is only statistical significant difference between compliance grades and education of mothers, social class and presence of symptoms. But no statistically significant difference was found as regard other factors. This is consistent with review by Peltzer and Pengpid who performed a systematic review of the association of socioeconomic status with adherence to treatment of patients with HIV/AIDS in low- and middle income countries and they concluded that Income, level of education, and employment/occupational status were significantly and positively associated with the level of adherence [15].

Also our results are in agreement with Cho and Kim who demonstrated that a lower education attainment level was associated with higher rates of nonadherence to antihypertensive medication in Korea. Furthermore, those with higher levels of educational attainment

were more likely to be adherent than those with lower levels. Also they demonstrated that age, gender, income and residence were associated with nonadherence to antihypertensive medication [16].

Moreover a study by Braverman and Dedier found that the effects of education on medication adherence varied by sex, showing that lower educational attainment was associated with lower adherence in women but not in men [17].

Conclusion and Recommendations

Compliance to L thyroxin therapy in our patients and/or their family was found to be reasonable. The most significant factors affecting the compliance were mother's education, social class and presence of symptoms at presentation.

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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Volume 1 Issue 2 August 2017

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