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RESEARCH ARTICLE

PATTERN OF MEDICATION ADHERENCE AND ITS DETERMINANTS AMONG THE PATIENTS WITH HYPOTHYROIDISM

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ABSTRACT

Hypothyroidism is one of the most common non-communicable diseases world-wide. In spite of having an economic therapy and simple medication schedule for the treatment of hypothyroidism, the patients still do not comply with the therapy. Aim was to assess the pattern of medication adherence among the patients with hypothyroidism.

Materials and methods: Data were collected from 162 subjects through patient interviews and case records. Adherence to treatment was determined based on the 4-item Morisky Medication Adherence questionnaire. A questionnaire with likely determinants of adherence was administered for all the patients and responses recorded.

Results: The mean age of the subjects under the study was 39.6 years. Majority (93.2%) of the subjects were females. The average duration of hypothyroidism among the subjects was 5.73 years. The distribution showed a mean TSH level of12.94 mIU/L. The mean knowledge score of the population was found to be 10.69 out of the total score of 15. Among the 162 patients with hypothyroidism, 38.27% had high adherence, 43.83% had medium adherence and 29 patients had low adherence to levothyroxine. Age was the only socio-demographic variable that was found to be associated with adherence level. Serum TSH levels were found to be significantly elevated in patients with low adherence. Subjects in the high and medium adherence groups had significantly higher knowledge scores when compared to the subjects in low adherence group. Factors such as lifestyle, patient-doctor relationship and health care system related factors were found to be associated with the level of adherence.

Conclusion: It was found that only 38.27% of the patients hadgood adherence to therapy. Along with the age and serum TSH values, knowledge regarding hypothyroidism and attitude towards therapy are important factors associated with adherence.

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INTRODUCTION

Hypothyroidism is a clinical condition in which the thyroid gland fails to produce enough thyroid hormone. The estimated prevalence of hypothyroidism is found to be 1-2% iniodine-replete communities. Females are found to be ten times more affected than males (Vanderpump, 2001).Synthetic levothyroxine is the treatment of choice with the goal to achieve clinical well-being and bring the serum thyrotropin level within the reference range (Okosieme, 2012).It is indeed surprising that in spite of having robust evidence about the benefits of thyroxine therapy, a simple medication schedule, and a very economical therapy, patients still do not comply and persist fully with treatment (Kalra *et al*., 2012). The estimated level of nonadherence to treatment regimen among the patients with chronic illnesses in the developed countries is 50% (Burkhart &Sabate, 2003). The nonadherence to the treatment in developing countries may vary from 15% to 90%.A survey was conducted to assess the adherence pattern among thyroxine users. The results showed that 22% of the patients admitted to nonadherence (Crilly, 2004). A study in a Brazilian cohort showed that 82% of subjects on thyroxine with raised serum TSH were not adherent to the treatment. (Bagattoli *et al*., 2000). A study was conducted to evaluate the problems with long-term levothyroxine therapy. Retrospective analysis of the course of treatment was carried out in 185 patients who were on levothyroxine therapy. The results revealed that 34% of the subjects with euthyroid goiter discontinued

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levothyroxine without the physician's knowledge 31 times out of which 29 times drug was started again, 17% of patients on whom a thyroidectomy was performed discontinued the medication out of which three had to restart the medication (Schifferdecker *et al*., 1990). Yavuz *et al*., 2014 evaluated levothyroxine adherence, daily dosage and serum TSH levels under treatment in primary hypothyroidism patients. Totally, 1636 subjects with the duration of hypothyroidism over one year were enrolled from eleven centers for the study. The results revealed that 32.3% of patients were not compliant with the treatment. There was a difference in compliance rates between the centers with a maximum of 84% and a minimum of 55%. The aim of the present study was to assess the pattern of medication adherence and its determinants among the patients with hypothyroidism.

MATERIALS AND METHODS

Cross sectional descriptive design was adopted for the study. Ethical clearance for the study was obtained from the institute ethics committee. A total of 162 subjects selected using consecutive sampling were interviewed and case records were checked. Patients who were on Levothyroxine therapy for at least 3 months were included in the study. Adherence to treatment was determined based on the 4-item Morisky Medication Adherence questionnaire which was administered in the local language. Later a questionnaire with likely determinants of adherence was administered for all the patients and responses recorded.

RESULTS

The mean age of the subjects under the study was 39.6 years with a standard deviation of 12.495 years. Out of 162 subjects majority (93.2%) were females. A total of 64 (39.5%) subjects had secondary levels of education. Majority (58.6%) were unemployed, and 130 (80.25%) were married. A total of 136 subjects (84%) belonged to nuclear families, and 119 (73.5%) were from rural area. The majority of the patients (67.91%) mentioned that health care professionals were their source of information regarding hypothyroidism. Habits of taking alcohol, smoking, betel chewing or any other substance abuse were absent in 96.92% subjects. All of the subjects were diagnosed with primary hypothyroidism. The family history of hypothyroidism was absent in 119 (73.5%) subjects. A total of 112 out of 162 subjects (69.1%) presented with symptoms of hypothyroidism. Only 18 patients (11.1%) admitted to having side effects of taking levothyroxine. Comorbidities were absent in majority (80.2%) of the subjects. Allopathic medicine was the sole modality of treatment for all of the subjects. Out of 112 subjects who were having symptoms of hypothyroidism, the majority (79 subjects) had muscle cramps. Out of the 18 subjects who admitted to having side effects, seven (38.88%) presented with dizziness on taking the tablet. The mean duration of hypothyroidism among the subjects was 5.73 years. The distribution showed a mean TSH level of 12.94mIU/L. The description of the subjects based on behavioral scale score showed a mean score of 20.61in the life style section,

Table 1: Socio-demographic variables of the patients with hypothyroidism

N=162

Variable	Categories	Frequency (no.)	Percentage (%)
Sex	Male	11	6.8
	Female	151	93.2
Education	No formal education	40	24.7
	Primary education	32	19.8
	Secondary education	64	39.5
	Higher secondary education & above	26	16
Occupation	Employed	67	41.4
	Unemployed	95	58.6
Marital status	Single	19	11.73
	Married	130	80.25
	Widowed/divorced	13	8.02
Domicile	Urban	43	26.5
	Rural	119	73.5
Type of family	Nuclear	136	84
	Joint	26	16
Source of information regarding hypothyroidism	Health professionals	110	67.91
	Health professionals & mass media	25	15.43
	Health professionals & family members	14	8.64
	Health professionals, mass media & family members	13	8.02
Habits	Betel chewing	5	3.08
	Nil	157	96.92

Table 2: Clinical variables of the patients with hypothyroidism

Variable	Categories	Frequency (no.)	Percentage (%)
Type of hypothyroidism	Primary	162	100
	Secondary	0	0
Family history of hypothyroidism	Present	43	26.5
	Absent	119	73.5
Symptoms of hypothyroidism	Present	112	69.1
	Absent	50	30.9
Side effects of levothyroxine tablet	Present	18	11.1
	Absent	144	88.9
Co-morbidities	Present	32	19.8
	Absent	130	80.2
Treatment modality	Allopathy	162	100
	Allopathy and traditional medicine	0	0

Table 3. Association of socio-demographic variables with the level of adherence among the patients with hypothyroidism

Variable		Level of adherence						$Statistical significance (p)
		High adherence (n=62)		Medium adherence (n=71)		Low adherence (n=29)		
		n	Percent (%)	n	Percent (%)	n	Percent (%)	
Sex	Male	5	45.4	4	36.4	2	18.2	0.85
	Female	57	37.7	67	44.4	27	17.9	
Education	No formal education	16	40	18	45	6	15	0.88
	Primary education	11	34.3	14	43.8	7	21.9	
	Secondary education	27	42.1	25	39.1	12	18.8	
	Higher secondary and above	8	30.8	14	53.8	4	15.4	
Occupation	Employed	28	35.7	30	43.2	9	21.1	0.43
	Unemployed	34	41.8	41	44.8	20	13.4	
Marital status	Single	6	31.6	6	31.6	7	36.8	0.15
	Married	50	38.5	61	46.9	19	14.6	
	Widowed/ divorced	6	46.1	4	30.8	3	23.1	
Domicile	Urban	19	44.2	19	44.2	5	11.6	0.40
	Rural	43	36.1	52	43.7	24	20.2	
Type of family	Nuclear	50	36.8	60	44.1	26	19.1	0.54
	Joint	12	46.2	11	42.3	3	11.5	
Source of information regarding hypothyroidism	Health professional	42	38.2	47	42.7	21	19.1	0.72
	Health professional & media	8	32	13	52	4	16	
	Health professional & family	8	57.1	5	35.7	1	7.2	
	Health professional, family & media	4	30.7	6	46.2	3	23.1	
Habits	Betel chewing	1	20	2	40	2	40	0.39
	No habits	61	38.9	69	43.9	27	17.2	

$Chi-square test

Table 4: Comparison of age in relation to adherence pattern among the patients with hypothyroidism

Variable	Level of adherence						$Statistical significance (p)
	High adherence (n=62)		Medium adherence (n=71)		Low adherence (n=29)		
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	
Age (in years)	42.5	13.556	37.27	10.254	38.93	14.165	.047*

$ ANOVA

Table 5: Association of clinical variables with the level of adherence

Variable		Level of adherence						$Statistical significance (p)
		High adherence (n=62)		Medium adherence (n=71)		Low adherence (n=29)		
		n	Percent (%)	n	Percent (%)	n	Percent (%)	
Family history of hypothyroidism	Present	19	44.2	14	32.5	10	23.3	0.20
	Absent	43	36.1	57	47.9	19	16.0	
Symptoms	Present	38	33.9	49	43.8	25	22.3	0.05
	Absent	24	48	22	44	4	8	
Side effects	Present	5	27.8	9	50	4	22.2	0.61
	Absent	57	39.5	62	43.1	25	17.4	
Comorbidities	Present	16	50	9	28.1	7	21.9	0.13
	Absent	46	35.4	62	47.7	22	16.9	

$ Chi-square test

Table 6: Comparison of duration of the illness and TSH levels in relation to level of adherence among the patients with hypothyroidism

Variable	Level of adherence									$Statistical significance (p)
	High adherence (n=62)			Medium adherence (n=71)			Low adherence (n=29)			
	Median	Range		Median	Range		Median	Range		
		Min	Max		Min	Max		Min	Max	
Duration in years	4.0	0.5	20.0	4.0	0.5	20.0	5.0	0.5	14.0	0.803
Serum TSH level (in mIU/L)	4.20	0.0	150.0	5.89	0.0	91.17	11.33	0.05	150.0	0.000*

$ Kruskal-Wallis test

Table 7: Comparison of behavioral scale score in relation to the level of adherence among the patients with hypothyroidism

Variable	Level of adherence						$Statistical significance (p)
	High adherence (n=62)		Medium adherence (n=71)		Low adherence (n=29)		
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	
Behavioral scale score							
Life style	22.66	0.788	19.94	1.393	17.86	1.432	0.000*
Social support	8.1613	1.65156	8.3944	1.5257	7.5172	2.0636	0.63
Patient-doctor relationship	5.871	0.33797	5.7183	0.58999	5.3793	0.94165	0.02*
Health care system related factors	5.6129	0.68604	5.3234	0.77043	5.0	0.80178	0.001*

$ ANOVA

Table 8: Comparison of knowledge score in relation to the level of adherence among the patients with hypothyroidism

Variable	Level of adherence						$Statistical significance (p)
	High adherence (n=62)		Medium adherence (n=71)		Low adherence (n=29)		
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	
Knowledge score	11	1.579	11.01	1.669	9.24	1.704	0.000*

$ ANOVA

*p<0.05, statistically significant at 5% level of significance

socialsupport score of 8.148, 5.716 in patient-doctor relationship section and health care system related score of 5.376. The average knowledge score of the patients with hypothyroidism was found to be 10.69 out of 15. Among the 162 patients with hypothyroidism, 62 (38.27%) had high adherence, 71 (43.83%) had medium adherence and 29 (17.9%) patients had low adherence to levothyroxine.

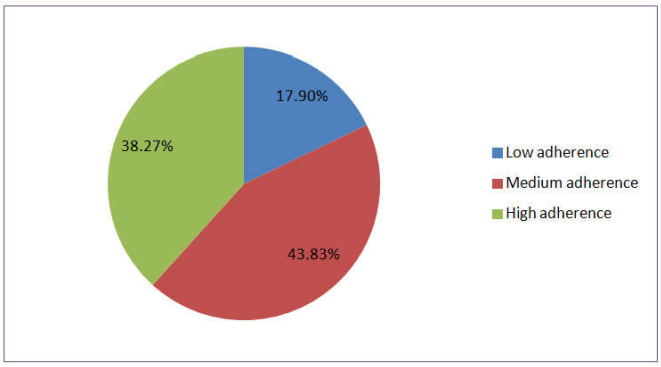

Figure 1. Level of medication adherence among the patients with hypothyroidism

None of the socio-demographic variables except age was found to be associated with adherence. Serum TSH level was the only clinical variable that was found to be associated with adherence. Patients with low adherence were found to have higher levels of TSH when compared to high and medium adherence groups. Lifestyle, patient-doctor relationship and health care system related factors sections of the behavioral scale were found to be associated with adherence. Patients with high adherence had higher scores in these sections. The analysis of the difference in mean values in knowledge scores showed that the low adherence group had a significantly lower knowledge score when compared to the medium and high adherence groups.

DISCUSSION

Results of a multi-center study conducted in Turkey (Yavuz *et al*., 2014) revealed a mean age of 46±13 years. The duration of levothyroxine treatment was 5.9±6.7 years. The mean dosage of levothyroxine was 96.6 µg/day. The mean serum TSH values of the 1636 primary hypothyroid subjects were found to be 4.8 mIU/L.In another study, the mean age of the participants was 41.1 years. The average dose of levothyroxine taken by the subjects was found to be 1.23 µg/kg/day. The study was conducted among 1925 primary hypothyroid subjects (Mithal *et al*., 2014). The present study included 162 patients with hypothyroidism with a mean age of 39.6 ± 12.495 years. The mean duration of levothyroxine treatment was 5.73±5.17 years. The mean dosage of levothyroxine among the subjects was 106.59±44.005 µg/day. The subjects had a mean TSH level of 12.94mIU/L. The assessment of medication adherence among the patients with hypothyroidism in the present study showed that out of the 162 subjects, only 62 (38.27%) had good adherence. 71 (43.83%) subjects were found to have medium adherence and 29 (17.9%) had low levels of adherence. This is in discordance with the study conducted by Mithal & Dharmalingam, 2014 where the subjects noncompliant to levothyroxine were only 8.88%. A study conducted in the United Kingdom revealed the status of nonadherence as 22% (Crilly, 2004). A multi-center study conducted by in Turkey showed 32.3% of nonadherence. The compliance rate varied between the centers with a maximum of 84% and a minimum of 55% (Yavuz *et al*., 2014). A comparative study on the compliance rates among seven conditions showed that 68.4% of the subjects with hypothyroidism were adherent to the levothyroxine therapy (Briesacher *et al*., 2008). A study conducted in a Brazilian cohort of 100 subjects showed a nonadherence rate of 82% (Bagattoli *et al*., 2000). The present study revealed that the age of the patient, serum TSH levels, knowledge regarding hypothyroidism and factors such as lifestyle, patient-doctor relationship and health care system related factors are associated with the level of adherence in hypothyroidism. This is similar to a study conducted to compare the adherence rates among seven different medical conditions. Younger age was found to be associated with lower adherence in hypothyroidism (Briesacher *et al*., 2008). Contrary to the present study, a study conducted by Mithal & Dharmalingam, 2014 showed that there was no association between serum TSH values and compliance.

A total of 69.47% of the compliant subjects were found to have abnormally high serum TSH values, and 30.35% had abnormally low values. A comprehensive review on three decades of research in patient adherence was done to identify the variables that influence compliance rates. The study couldn't identify a single variable that is consistently associated with compliance, but around 200 doctor-patient and

interaction related variables were identified (Vermeire *et al*., 2001). The present study showed that only 38.27% of the patients have good adherence to therapy. It was concluded that along with the age and serum TSH values, knowledge regarding hypothyroidism and attitude towards therapy were found to be important factors associated with adherence. Thus it is essential to take actions for improving the knowledge about hypothyroidism and attitude towards the therapy. Regular health education initiatives and motivational counseling made available at the outpatient department can play a crucial role in improving the adherence to medication.

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