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Status of Depression in Patients with Hypothyroidism

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Abstract **Original Research Article**

Introduction: In patients with endocrine diseases a high prevalence of mood disorders in general and particularly of major depression (MD) has been commonly found. Specifically, regarding thyroid diseases, the prevalence of depressive symptoms in hypothyroidism is near to 50%. ***Aim of the study:*** The aim of this study was conducted to determine the status of depression in patients with hypothyroidism attending in a tertiary level hospital. ***Materials & Methodology*:** This Cross-sectional observational study was conducted in the Out Patient Department (OPD), Medicine Department in Dhaka Medical College Hospital, and Dhaka, Bangladesh from 4 months September to December, 2012. Due to time and resource constraint only 90 sample were collected. Analysis was performed by using a computer based statistical program SPSS-16 and MS-Excel 2016. ***Result:*** Among the respondents the highest frequency 27.8% was in the age group up to 25 years. This was followed by 23.3% who were in the age group 26-30 years, 21.1% were up to 31-35 years of age 17.8% were in 36-40 years, while 10% were above the age of 40 years (Mean 30.97±6.62 years). Majority of the respondents 84.4% were under treatment within 5 years and the rest 15.6 % were taking treatment over 5 years.64.4% of the respondents were under control, 20% were deteriorated and 15.6% were same as before. Among the respondents, 51.1% had no depression, 11.1% had mild depression, 35.6% had moderate depression and 2.2% had severe depression. ***Conclusion:*** The current study reveals that there is a significant association between development of depression and hypothyroidism. During the treatment of hypothyroidism, the depressive illness among the patient should be given emphasis and further study with larger sample size is recommended.

Keywords: Hypothyroidism; Endocrine disorder.

INTRODUCTION

Hypothyroidism is a common endocrine disorder. It is usually a primary process resulting from failure of the gland to produce adequate amount of hormone. Primary gland failure accounts for 90% to 95% of all hypothyroid cases [1]. The prevalence rate of hypothyroidism depends upon population studied. Prevalence of primary hypothyroidism is 1:100 but may increase to 5:100 if patients with sub-clinical hypothyroidism are included. In the Framingham study, the prevalence rate of hypothyroidism was up to 20% [2]. In the United States, the third National Health and Nutrition Examination Survey (NHANES III) of 16,533 patients reflecting the US population reported hypothyroidism in 4.6% patients (0.3% overt and 4.3% sub-clinical). Internationally, the prevalence is reported as high as 2-5% depending on the study, increasing to 15% by age 60 years [3]. According to study of thyroid clinic Bangabandhu Sheikh Mujib Medical University, 10-12% of the patients were presented with hypothyroidism [4]. At the 20 years follow-up of the Whickham cohort provided incident data and allowed the determination of risk factor for hypothyroidism in this period. The mean incidence of spontaneous hypothyroidism in the surviving women over the 20 years follow-up was 3.5 per 1000 per year, rising to 4.1 per 1000 per year and in men was 0.6 per 1000 per year. The prevalence of congenital hypothyroidism is approximately 1 in 3000-4000 live births [5-7]. 85% of cases of congenital hypothyroidism were due to thyroid dysgenesis and 15% have thyroid dyshormonogenic defects transmitted by an autosomal recessive mode of inheritance [8]. Clinical presentation of hypothyroidism is variable but well established. However, clinical features vary significantly among different populations

owing to their climate, education status and awareness about the disease. Hypothyroidism commonly manifests as a slowing in physical and mental activity but may be asymptomatic. Classic signs and symptoms such as cold intolerance, puffiness, decreased sweating and coarse skin. Consequently, the diagnosis of hypothyroidism is based on clinical suspicion and confirmed by laboratory testing. There is a clear connection between the process of thyroid hormone regulation and depressive disorder. There has been much discussion in the literature regarding the factors that influence the development of depressive symptoms in patients with hypothyroidism. The reason hypothyroidism affects so many different aspects of the body is because the main thyroid hormones, T3 & T4, basically control the speed at which the body is running and utilizing resources. However, when thyroid function is decreased, all of these systems slow down including the productions of chemicals in the brain like serotonin. Serotonin is a neurotransmitter that is produced by the brain to help regulate mood along with dopamine, another mood elevating brain chemical. They are responsible for keeping individuals in a positive frame of mind and out of depression. However, hypothyroidism decreases the production of both serotonin and dopamine in the brain due to deficiency of key protein and amino acids. The result is depressed mood, which manifests itself as persistent sadness, anxiety, irritability and disinterest in daily activities.

OBJECTIVES

General Objectives

- To find out the Depression in patients with hypothyroidism.

Specific objectives

- To determine the status of depression in patients with hypothyroidism.
- To find out the association of depression and socio-demographic factors
- To know the status of disease condition among the respondents.

MATERIALS & METHODOLOGY

This Cross-sectional observational study was conducted in the Out Patient Department (OPD), Medicine Department in Dhaka Medical College Hospital, and Dhaka, Bangladesh from 4 months September to December, 2012. Purposive sampling method was adopted in the current study. Patients were selected who came to Out Patient Department (OPD) of Dhaka medical college hospital for the treatment of hypothyroidism meeting the inclusion criteria first come first included basis. Due to time and resource constraint only 90 sample were collected. Data were collected through interview from the patient of Hypothyroidism. Severity of depression was determined by Customized "Hospital anxiety and depression score" (HADS) was used to determine the level of depression that a patient is experiencing. The (HADS) is a fourteen-item scale that generates ordinal data. Seven of the items relate to Anxiety and seven of the items relate to depression. Ethical permission was given from SUB and the privacy, confidentiality will be strictly be maintained during data collection. Analysis was performed by using a computer based statistical program SPSS (Statistical Package for Social Sciences) version 16. Descriptive statistics were generated for socio demographic and status of hypothyroidism and status of depression related data and cross tabulation with test of significant were also generate among them.

Inclusion Criteria

- Age > 14 years to 60 years.
- Both male and female was enrolled.
- Clinically diagnosed and biochemically confirmed hypothyroid cases

Exclusion Criteria

- Associated other chronic diseases or conditions that can produce depression
- Neoplastic diseases.
- Chronic renal failure.
- Chronic liver disease.
- Coronary artery diseases
- Metabolic disorders
- Respondents who did not give informed consent.

RESULTS

To assess the Status of Depression among Patients with Hypothyroidism attending in a tertiary level hospital cross-sectional study was conducted. The findings of the study are shows that the mean±SD age of the hypothyroid patients was 30.97 ±6.62 years and the highest frequency of the respondents, 25(27.8%) were in the age group up to 25 years. This was followed by 23.3% (n=21) who were in the age group 26 - 30 years, 21.1% (n=19) were of up to 31-35 years of age 17.8 %(n=16) who were in 36-40 years, while 10%(n=9) were above the age of 40 years [Figure-1]. Among the respondents, majority 77.8% (n=70) were Female and the rest 22.2 % (n=20) were male [Figure-2]. We found the majority 90% (n=81) were Muslim. The rest were Hindu 7.8 % (n=7) and Christian 2.2% (n=2), about 72.2% (n=65) were Married and unmarried 26.7 % (n=24) and Divorced 1.1% (n=1). There about 37.8% (n=34) Education were up to HSC & Equivalent level, 28.9% (n=26) Education were up to SSC level, 17.8% (n=16) Education were up to Primary level, 12.2% (n=11) Education were up to Graduate level, 3.3% (n=3) Education were up to Masters Level. The mean ± SD income of the hypothyroid patients was 7521.11 ±5021.24 BDT and among the respondents, 41.1% (37) had monthly income between Tk-5001-10,000. 40% (36) had monthly income up to Tk-5000. 10% (9) had monthly income above Tk-15000. 8.9% (8)

had monthly income between Tk-10001-15000 [Table-1]. Among the respondents, majority 84.4% (n=76) were under treatment within 5 years and the rest 15.6 % (n=14) were taking treatment over 5 year [Table-2]. We found the disease condition of the patients 64.4% (n=58) were under control, 20% (n=18) were Deteriorated and 15.6% (n=14) were same as before [Table-3]. Maximum 46(51.1%) had no depression, 11.1% (n=10) had mild depression, 35.6% (n=32) had moderate depression and 2.2% (n=2) had severe depression [Table-4]. In terms of enjoying things used to enjoy, 51.1% enjoy mildly, 35.6% (n=32) enjoy moderately and 2.2% (n=2) enjoy severely. Among the respondents, 50% (45) can laugh and see the funny side of things mildly, 34.4% (n=31) moderately and 3.3% (n=3) were severely. In terms of feeling cheerful, among them 57.8% (52) feel mildly, 24.4% (n=22) moderately and 6.7% (n=6) severely. By Feeling of slowed down 51.1% (46) feel mildly, 28.9% (n=26) moderately and 4.4% (n=4) severely. Among the respondents, 42.2% (n=38) lost their interest in self appearance mildly, 31.1% (n=28) were moderately and 4.4% (n=4) severely. By looking forward with enjoyment to things, among the respondents 58.9% (n=53) can see mildly, 21.1% (n=19) moderately and 4.4% (n=4) severely. And by capacity to enjoy a good book or radio or TV program, among the respondents, 50% (n=45) had mild, 23.3% (n=21) had moderate capacity to enjoy a good book or radio or TV program [Table-5]. From a total 90 hypothyroid patients 46(51.1%) patients had no symptoms of depression and 44 (48.9%) patients had some degree of depression. Among them mild, moderate and severe depression were present in 10(11.1%), 32(36.1%) and 2(2.2%) patients respectively. Statistically it was found significant ($p<0.5$). That means there is an association between development of depression and Status Hypothyroidism.

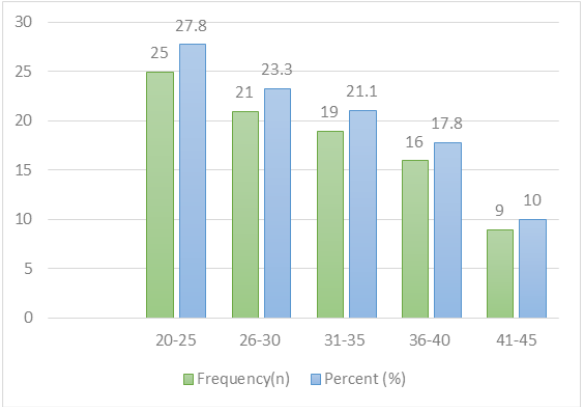

Fig-1: Distribution of the Respondents by Age (N=90)

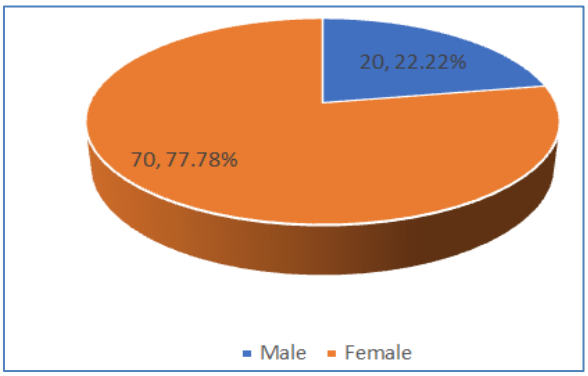

Fig-2: Distribution of Respondents by Sex (N=90)

Table-1: Distribution of Respondents by demographic profile (N=90)

Demographic profile		Frequency (n)	Percent (%)
Religion	Islam	81	90.0
	Hindu	7	7.8
	Christian	2	2.2
Marital Status	Married	65	72.2
	Unmarried	24	26.7
	Divorced	1	1.1
Education Level	Primary	16	17.8
	SSC	26	28.9

Demographic profile		Frequency (n)	Percent (%)
	HSC & Equivalent	34	37.8
	Graduate	11	12.2
	Masters	3	3.3
Monthly income	Up to BDT 5000	36	40.0
	BDT 5001 – 10000	37	41.1
	BDT 10001 – 15000	8	8.9
	Above BDT 15000	9	10.0

Table-2: Distribution of Respondents by duration of disease (N=90)

Duration of taking treatment	Frequency (n)	Percent (%)
Within 5 years	76	84.4
More than 5 years	14	15.6

Table-3: Distribution of Respondents by disease condition (N=90)

Status of Sufferings	Frequency(n)	Percent (%)
Under control	58	64.4
Same as before	14	15.6
Deteriorated	18	20.0

Table-4: Distribution of Respondents by Depression Status (N=90)

Depression	Status	Frequency(n)	Percent (%)
Yes	Mild	10	11.1
	Moderate	32	35.6
	Severe	2	2.2
No	Normal	46	51.1

Table-6: Depression related expressions (N=90)

Statement	Expression	Frequency(n)	Percent (%)
Enjoy the things used to enjoy	No Symptoms	10	11.1
	Mild	46	51.1
	Moderate	32	35.6
	Severe	2	2.2
Laughing and seeing the funny side of things	No Symptoms	11	12.2
	Mild	45	50.0
	Moderate	31	34.4
	Severe	3	3.3
Feel cheerful	No Symptoms	10	11.1
	Mild	52	57.8
	Moderate	22	24.4
	Severe	6	6.7
Feeling of slowed down	No Symptoms	14	15.6
	Mild	46	51.1
	Moderate	26	28.9
	Severe	4	4.4
Loss of interest in self appearance	No Symptoms	20	22.2
	Mild	38	42.2
	Moderate	28	31.1
	Severe	4	4.4
Looking forward with enjoyment to things	No Symptoms	14	15.6
	Mild	53	58.9
	Moderate	19	21.1
	Severe	4	4.4
Enjoy a good book or radio or TV program	No Symptoms	24	26.7
	Mild	45	50.0
	Moderate	21	23.3

Table-7: Distribution of Respondents by Status of Sufferings of Depression (N= 90)

Depression status	Disease Status			Total
	Under control	Same as before	Deteriorated	
Normal	46 (79.3%)	0(0.0%)	0(0.0%)	46(51.1%)
Mild	4(6.9%)	6(42.9%)	0(0.0%)	10(11.1%)
Moderate	8(13.8%)	8(57.1%)	16(88.9%)	32(35.6%)
Severe	0(0.0%)	0(0.0%)	2(11.1%)	2(2.2%)
Total	58(100.0%)	14(100.0%)	18(100.0%)	90(100.0%)

DISCUSSION

We studied diagnosed cases of hypothyroid patients to assess the Status of Depression among Patients attending in a tertiary level hospital cross-sectional study was conducted. The mean ± SD age of the hypothyroid patients was 30.97 ±6.62 years. Among the respondents more than one-fourth were in the age group up to 25 years, followed by less than one-fourth were in the age group 26 - 30 years, one-fifth were of up to 31-35 years of age, one-sixth were in 36-40 years, and rest tenth were above the age of 40 years. By sex seventy percent were Female. Hypothyroidism is more common in female. Sapini, Rokiah, Nor Zuraida stated that among the functional disorder of the thyroid, hypothyroidism is the most common with prevalence ranged from 1.0%-11.7% in female and 0.9%-5.14% in male [9]. By religion ninety percent were Muslim. By marital status around three-fourth were married, more than quarter were unmarried. By education more than one-fourth of respondents were up to SSC level, more than one-third were up to HSC level or equivalent, more than one-sixth were up to Primary level, more than one-tenth were up to Graduate level and rest were up to Master's level. The mean ± SD monthly income of the hypothyroid patients was 7521.11 ±5021.24 BDT and among the respondents, more than two-fifth had monthly income between Tk-5001-10,000. Two-fifth had monthly income up to Tk-5000. One-tenth had monthly income above Tk-15000. Among the respondents, majority around 90% were under treatment within 5 years and the rest more than 10% were taking treatment over 5 years. Among the respondents, more than three-fifth were under control, one-fifth was deteriorated and more than one-fifth were same as before.

Among the respondents, more than half had no depression. Around one-tenth had mild depression, one-third had moderate and only two had severe depression. The findings of present study are consistent with the findings of with the findings of the studies done by Haggerty and co-workers [10]; Constant *et al*. [11, 12]; Sapini, Rokiah, Nor Zuraida [9]; Gold, Pottash and Extein [13]. Haggerty *et al*. [10] described that a high incidence of co-morbidity exists between depression and both clinical and sub-clinical hypothyroidism. A small study of 31 subjects highlighted that the lifetime frequency of depression was significantly higher in those who met the criteria for sub-clinical hypothyroidism (56%) than in those who did not (20%). Constant *et al*. [11] verified the presence of anxiety and depressive symptoms in hypothyroidism. The authors found that in hypothyroidism, the participants were more anxious and depressed than the controls [11]. Constant *et al*. [12] stated that adult-onset hypothyroidism may have a variety of somatic, neuropsychological and psychiatric symptoms such as inattentiveness, inability to concentrate, deficits in memory, psychomotor slowing, depressive mood state, anxiety, and sometimes persecutive delusions. Sapini, Rokiah, Nor Zuraida [9] described that depression and anxiety are the most common psychiatric presentation in thyroid disorders. Both subclinical and overt thyroid disorder have been associated with mood disorders. Gold, Pottash and Extein [13] evaluated the relationship between hypothyroidism and depression in 250 patients referred to a psychiatric hospital for treatment of depression. They found that less than 1% had overt hypothyroidism; 3.6% had mild and 4% had subclinical hypothyroidism. They suggested that a significant proportion of patients with depression may have early hypothyroidism. Kierkegaard and Faber [15] explained the pathogenesis of endogenous depression. They described that a lack of serotonin in the brain has a central role in the development of depression. Acute as well as chronic T3 treatment has been shown to increase the serotonin levels in the cerebral cortex and plasma serotonin levels correlate positively with T3 concentrations. Brain serotonin synthesis is reduced in hypothyroidism and increased in hyperthyroidism. Constant *et al*. [12] described that T4 and T3 hormones regulate the cellular function in most organs including the brain. High concentrations of T3 nuclear receptors are found in the amygdala and hippocampus of brain. It could be thus predicted that in hypothyroidism there might be a decreased regional cerebral metabolism and hippocampus causing depression. Depression related statements it was found that among the respondents, more than half can enjoy things used to enjoy mildly, one-third enjoy moderately. Half of the respondents can laugh and see the funny side of things mildly, one-third moderately. In terms of feeling cheerful, among them around sixty percent feel mildly, one-fourth moderately and by feeling of slowed down half of them feel mildly, thirty percent moderately. Among the respondents, more than forty percent lost their interest in self

appearance mildly, one-third moderately, by looking forward with enjoyment to things, sixty percent can see mildly, one-fifth moderately. By capacity to enjoy a good book or radio or TV program, among the respondents, half can enjoy mildly, one-fourth can moderately. Bahlsa and Carvalhob [16] stated that thyroid hormones regulate the neuronal cytoarchitecture, the normal neuronal growth and the synaptogenesis, and their receptors are widely distributed in the central nervous system. In patients with endocrine diseases there has been commonly found a high prevalence of mood disorders in general and particularly of major depression (MD). Specifically, regarding thyroid diseases, the prevalence of depressive symptoms in hypothyroidism is near to 50% whereas in hyperthyroidism it reaches up to 28% of the cases. Clinical depression occurs in more than 40% of people suffering from hypothyroidism. Among the respondents who were under control of hypothyroidism were found having no depression and those who were either deteriorating or same as before were found suffering from moderate and severe level of depression than the others ($p<0.5$).

Limitations of the study

The present study has the sample size of the study was small due to time and resource constraint, only 90 samples were collected. The study was conducted in one tertiary care hospital of Bangladesh, so the findings may not represent the situation of whole country.

CONCLUSION

The present study concludes that the patients of hypothyroidism were mostly female and young age group. More than half were under control of hypothyroidism were found having no depression. The study also showed that depression was found 48.9% in hypothyroid patients and they were suffering from mild, moderate and severe depression respectively. Depression should be properly evaluated in hypothyroid patient and must be treated accordingly. A further study is necessary with larger sample size involving other centers of the country.

RECOMMANDATIONS

The result of the present study should be applied with caution until validated by further larger multi-centered study with adequate sample size.

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