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Burden of Thyroid and Lipid disorders among Elderly Depressed Patient: A cross sectional study in Nepal

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Abstract

Background and Objectives: Depression is common psychiatric illness among geriatric population however it remains underdiagnosed and undertreated. Majority of thyroid and lipid disorders are asymptomatic or have vague symptoms unless they land with emergency medical conditions. The burden of thyroid and lipid disorder are under reported in elderly population especially depressed one. The objective of the study was to measure the burden of thyroid and lipid disorders among Elderly Depressed Patient.

Materials and methods: A hospital based cross-sectional study was conducted at BP Koirala Institute of Health Sciences, Dharan. All written consent patients more than 60 years of age with diagnosed of depression using ICD 10 criteria were screened for thyroid and lipid disorders as per hospital protocol. Those cases found to have thyroid and lipid disorders were reevaluated by physician for possibilities to rule out the false positive causes.

Results: The prevalence of thyroid disorder and dyslipidemia was 29% and 62.7% respectively among 51 elderly depressed patient. Subclinical hypothyroidism was associated with 25% of the cohort. Hypertriglyceridemia (54.9%) was the most common form of lipid disorders followed by 47.1% increased total cholesterol level, 19.6% increased LDL level and 13.7% low HDL level. The presence of thyroid and lipid disorders were not significantly associated with types of depression (mild, moderate, severe and recurrent).

Conclusion: Low threshold should be kept to screen subclinical hypothyroidism and dyslipidemia among geriatric depressed population due to alarming burden and adverse impact on quality of life and longevity.

Key Words: Dyslipidemia, Depression, Elderly, Thyroid Disorder.

Introduction

The average life expectancy of mankind is increasing mainly due to better nutrition, safe drinking water, improved sanitation, effective preventive public health interventions and modern medicine however this has shifted the health burden on geriatric population, mental health, non-communicable diseases, malignancy and road

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traffic accidents.¹ The common chronic medical conditions associated with aging are heart disease, arthritis, cataract, stroke, cancer, diabetes and subclinical hypothyroidism.² In elderly, psychiatric illness like major depression is also common; 44% elderly in Canada and 17% elderly in Dutch have depression.^{3,4} Depression is associated with increase morbidity and mortality of any other physical health problem.⁵ Depression remains under-diagnosed and under-treated in elder as they

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have different presentations.⁵

The most common thyroid disorder is subclinical hypothyroidism (SCH). SCH is prevalent in the general population about 4-10%. It occurs about 15% in elderly women and 10% in elderly men.⁶ SCH usually present with nonspecific vague symptoms and one of them could be depressive mood. Lipid disorder are usually asymptomatic unless they present with coronary artery disease, cardiovascular accidents and/or peripheral vascular disease. Hypothyroidism is one of the treatable cause for depression and/or dyslipidemia. There is an association between thyroid status and cognitive decline, depression and dementia in the elderly.⁶

Presence of depression in elderly increases the risk of coronary heart disease and total mortality; and also SCH.⁷ On the other hand, prevalence of depression and SCH also increased with cardiovascular disease and other chronic physical diseases.⁶ Depression is considered to be an independent risk factor for coronary artery disease, heart failure in older hypertensive patients and mortality.⁷ The SCH is associated with cardiovascular risk factor and depression in the elderly.⁸

A large cross-sectional study in Colorado of 25,862 persons found that those with serum TSH concentrations of 5.1 to 10 mIU/L had higher serum cholesterol levels than those who were euthyroid.⁹ The Nagasaki study found a 2-fold elevation in the risk of angina and MI in men but not in women with SCH.¹⁰ A study of patients with SCH who were between the ages of 70 and 79 years showed 3-fold increased risk of congestive heart failure, but no increased risk of coronary or cerebrovascular disease or cardiovascular mortality.¹¹ The Busselton Health Study in Australia revealed 3-fold increase in the risk of coronary artery disease and 2-fold increase in the risk of cardiovascular mortality in patients with SCH.¹² Women over 50 years of age with SCH with history of smoking have the highest risk for cardiovascular complications.¹³ A 12-year study of 3, 233 aged 65 years and older found no significant difference in the risk of coronary heart disease, cerebrovascular disease, cardiovascular

death, or all-cause death between euthyroid patients and those with subclinical.¹⁴⁻¹⁸ Another studies suggest an increased risk of depression and panic disorder in SCH in elderly.^{19,20} Both the conditions are bidirectional.²⁰

The aim of our study is to measure the burden of thyroid and lipid disorders among elderly depressed patient and correlate the relationship among these entity with severity of depression in elderly.

Material and methods

The study was approved by the institutional review board of the hospital. This is a cross-sectional, hospital based study done at BP Koirala Institute of Health Sciences (BPKIHS), Dharan, Nepal for a period of one year. All consecutive depressed patients of age 60 years and above, diagnosed on the basis of ICD – 10 criteria coming in psychiatric services of BPKIHS were included. A written informed consent was taken before enrollment of the subject. Consent was received from care taker among those who were unable to provide written consent. Considering 10% prevalence of depression among elderly we calculated the sample size of 35 with 95% confidence interval and 90% power of the study. Adding 30% as biases the final sample size was 51. Epidemiological profiles (age, sex, ethnicity, occupation, education and geographical areas, etc) were noted using a semi-structured Performa developed for the study. Relevant investigations were done and interpreted as per hospital protocol. Patient under substance use or drugs that would altered thyroid functions (given for other than thyroid disease) and lipid profile (given for other than dyslipidemia) were excluded. Those patient with deranged thyroid and lipid profile were reevaluated by physician to rule out possible cause other than thyroid or lipid disorders. Data were collected and entered in Microsoft Excel Software. Analysis was done using SPSS Software.

Results

There were 51 patients enrolled. The mean age of the patients was 66.94 ±7.56. Two third of them

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were female. Majority were illiterate, married, house maker and Hindu by religion. Family history of depression was associated with 15% of the cohort. (Table 1)

Among the types of depression, recurrent depression was noted in 39.2%, severe depression in 13.7%, moderate depression in 39.2% and mild depression in 7.8%. (Figure 1)

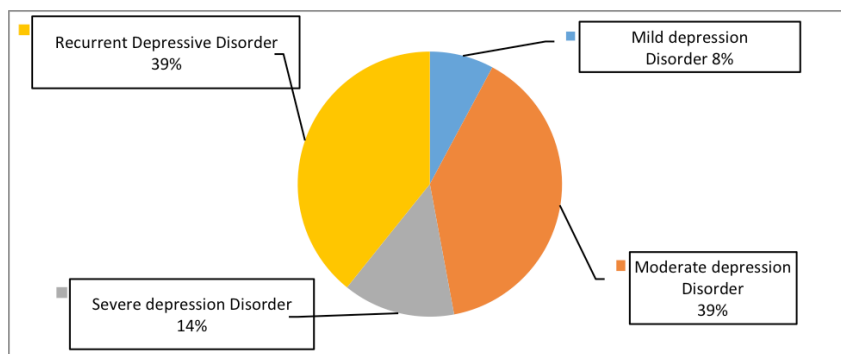


Figure 1: Types of depression

Table 1: Socio-demographic variables of the study group

Characteristics	Categories	Number	Percentage
Age group in years	60 – 69	35	68.6
	70 – 79	11	21.6
	≥80	5	9.8
Mean age of patient in years ± SD (Min – Max)		66.94 ±7.56 (60 – 89)	
Gender	Female	34	66.7
	Male	17	33.3
Educational level	Illiterate	26	51.0
	Can read and write	12	23.5
	Primary	6	11.8
	SLC and above	7	13.7
Occupation	Business	4	7.8
	Farmer	9	17.6
	House maker	25	49.0
	Service	7	13.7
	Unemployed	6	11.8
Religion	Bhuddhist	3	5.9
	Christian	3	5.9
	Hindu	43	84.3
	Kirat	2	3.9
Socio Economic Status	Low	19	37.3
	Middle	32	62.7
Marital Status	Married	42	82.4
	Widow	9	17.6
Family history	None	43	84.3
	Present	8	15.7
Total		51	100.0

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Among 51 cases enrolled, thirty four cases (66.7%) had other comorbidities, most commonly systemic hypertension (35.3%), followed by type 2 Diabetes mellitus (15.7%). Ten cases (19.6%) had more than one multiple comorbidities. Among hypertensive cases two third were associated with isolated hypertension. Diabetes Mellitus (DM) was the second most common comorbidity accounting for 8 cases (23.53%). (Table 2) There was no statistical significance between types of depression and the above mentioned comorbidities. (Table 3)

Table 2: Burden of other comorbidities

Comorbidities	Frequency	Percentage
Overall comorbidities	34	66.6
Systemic Hypertension	18	35.29
Diabetes mellitus	8	15.68
Tuberculosis (treated cases)	4	7.84
Chronic obstructive pulmonary disease	3	5.88
Symptomatic gall stone disease	3	5.88
Heart disease	3	5.88
Parkinson's Disease	2	3.92
Hearing impairment 2	2	3.92

Table 3: Association between comorbidity and types of depression

Comorbidity	Type of depression				Total
	Mild	Moderate	Severe	Recurrent	
No	2	6	2	7	17
Yes	2	14	5	13	34
Total	4	20	7	20	51
$\chi^2 = 0.69, p \text{ value} = 0.87$					

Seventy one percentage of the cohort were euthyroid followed by 25% subclinical hypothyroid (SCH) and 4% hyperthyroid. (Figure 2). SCH was more prevalent among females whereas hyperthyroidism were equally distributed with gender without statistical significance. (Table 4) The relation between thyroid status and types of depression was not statistically significant. (Table 5)

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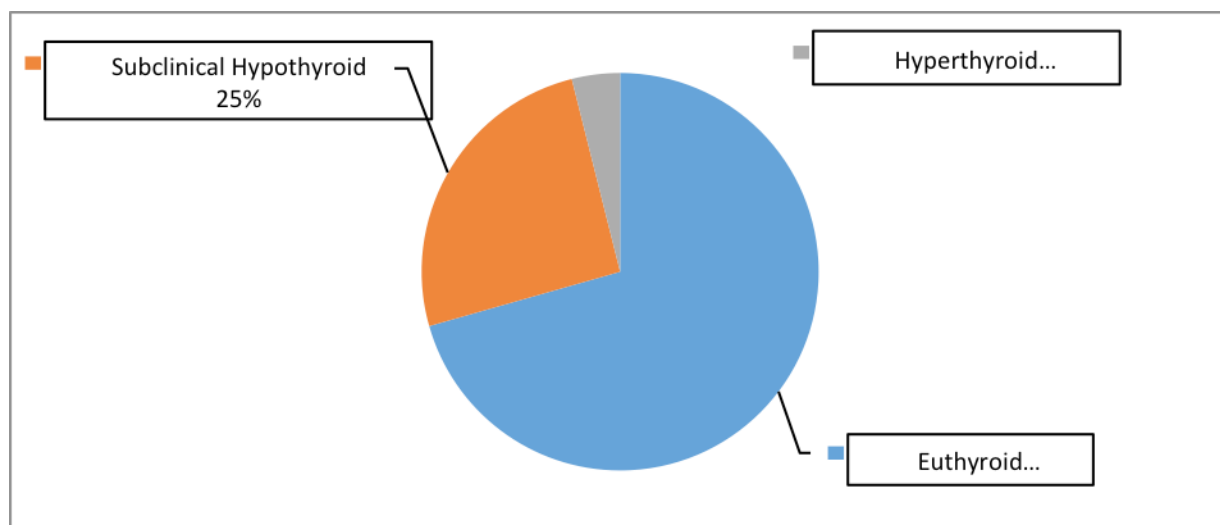


Figure 2: burden of thyroid disorder

Table 4: Thyroid profile and gender distribution

Gender	Thyroid Status			Total
	Euthyroid	SCH	Hyperthyroid	
Female	23 (67.64%)	10(29.41%)	1(2.94%)	34 (100%)
Male	13(76.47%)	3 (17.64%)	1(5.88%)	17 (100%)
	36(71%)	13(25%)	2(4%)	51 (100%)

$\chi^2 = 0.99$, p value = 0.69

Table 5: Association between thyroid profiles and types of depression

Thyroid status	Type of depression				Total
	Mild	Moderate	Severe	Recurrent	
Euthyroid	2	17	6	11	36
Subclinical hypothyroid	1	3	1	8	13
Hyperthyroid	1	0	0	1	2
Total	4	20	7	20	51

The mean and median values of triglyceride and LDL was above normal limit. (Table 6) Hypertriglyceridemia (54.9%) was the most common lipid disorders followed by hyper cholesterolemia (47.1%), high LDL (19.6%) and low HDL (13.8%) levels. (Table 7)

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Table 6: Distribution of lipid profile

	Total cholesterol	Triglyceride	HDL	LDL
Mean±SD	198.26±53.02	197.09±149.05	49.24±14.44	124.96±44.19
Median	191	169	47	114
Mode	141	87	58	84
Range (min – max)	218 (95 -313)	795 (53 – 848)	66 (25 – 91)	162 (66 – 228)

There was no statistical significance between lipid disorders and types of depression. (Table 7)

Table 7: Association between lipid disorder and types of depression.

Lipid	Range	Type of depression				Total (%)
		Mild	Moderate	Severe	Recurrent	
Total Cholesterol	Normal	2	9	5	11	27 (52.9)
	Increased	2	11	2	9	24(47.1)
	Total	4	20	7	20	51
$\chi^2 = 1.51, p \text{ value} = 0.67$						
Triglycerides TG	Normal	1	11	5	6	23(45.1)
	Increased	3	9	2	14	28(54.9)
	Total	4	20	7	20	51
$\chi^2 = 5.24, p \text{ value} = 0.15$						
High density lipoproteins HDL	Normal	4	19	5	16	44(86.2)
	Decreased	0	1	2	4	7(13.8)
	Total	4	20	7	20	51
$\chi^2 = 3.89, p \text{ value} = 0.27$						
Low density lipoprotein LDL	Normal	2	17	6	16	41(80.4)
	Increased	2	3	1	4	10(19.6)
	Total	4	20	7	20	51
$\chi^2 = 2.74, p \text{ value} = 0.43$						

Discussion

According to the classification of the old age; ²¹ most of the cases were young old of 60 to 69 years age group comprising of 68.6%, followed by the middle old of 70 to 79 years comprising 21.6% and

lastly the very old more than 80 years comprising 9.8%. This is similar to the age pyramid of Nepal.²²

In our study, there was preponderance of female; the female to male ratio was 2:1. Female preponderance has been shown by other studies as well.²³⁻²⁵

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Forty nine percentage were literate which is comparable to Nepal's literacy rate of 57.4% where the female literacy rate is 46.7%.²⁶ As there was female preponderance most of the cases were housewife. Hindu (84.3%) was the commonest religion which is similar to the distribution of religion in the country.²⁷

In the 51 cases of depression, 39.2% were recurrent. Severe, moderate and mild depression constituted 13.7%, 39.2% and 7.8% respectively. This is different from the study by Das BKL et al where the severe depression was the most common accounting for 36%.²⁶

In our study, single comorbidity was present in 66.7% cases whereas 19.6% had multiple comorbidities. This is comparable to a population study where 24% aged 65 years or older; and 31.4% aged 85 years or older had multiple comorbidities.²⁸ The prevalence of comorbidities and number of comorbid conditions increase with age.²⁹ In this study, hypertension (35.2%) followed by Diabetes mellitus (15.3%) were the two most common comorbidities. This is similar to the study by Gerda G F et al where in a sample size of 4126 subjects, 57% reported hypertension, 20% diabetes, 15% coronary artery disease, 9% cancer, and 9% cerebrovascular diseases; 29% reported no disease conditions, whereas 29% multiple comorbidities.³⁰ Moreover, many older men and women experience a gradual decline in physical strength, gait speed, manual dexterity, memory, and cognitive skills, in the absence of a clinically manifest disease process. Coexistence of multiple such impairments complicates the diagnosis, treatment, and natural course of individual health conditions in older adults.³¹ In our study, the presence of comorbidity was not related to the severity of depression which is similar to the findings of Polona Selic et al where the burden of somatic comorbidity was shown to be smaller than the impact of psychosocial determinants for depression and there was no significant difference in the comorbidity in depressed and non-depressed subjects.³²

Most of the patients were euthyroid (71%) followed by subclinical hypothyroid (25%) and hyperthyroid (4%), but there were no cases of clinical hypothyroidism. This is similar to the study by Lokesh Jain et al where the prevalence of thyroid disorder in depression was 20% and subclinical hypothyroidism(13.3%) was more prevalent than clinical hypothyroidism (6.7%), but there were no cases of hyperthyroidism.^{23,24} A study by Vale'ria Bahdur Chueire et al showed that depression was observed in the subclinical hypothyroid patients (49%) and suggested that mood disturbances are frequent in the elderly with elevated serum TSH levels, but they do not differ in the primary hypothyroid and the nonthyroidal sick patients.³³ Benedetta Demartini et al found that subclinical hypothyroidism is associated with the presence of depressive symptoms beyond the role of possible confounding factors.³⁴ In a study by Aejaz Ul Noor et al, they found that major psychiatric disorders namely major depressive disorders had demonstrable changes in their thyroid functions and the prevalence of major depressive disorders was 30.77% in Sub-Clinical Hypothyroidism and 6 % in Clinical Hypothyroidism.³⁵

In a prospective cohort study of 606 older adults, both baseline and persistent subclinical hypothyroidism were not associated with increased depressive symptoms; but results were consistent with a possible association between subclinical hyperthyroidism and increased depressive symptoms.³⁶ In our study also, the thyroid status was not associated with increased depressive symptoms. However, in a study of younger sample (15 to 60 years) by Das BKL et al, a multiple comparison testing between the groups of the patients of mild, moderate and severe depression showed significantly high TSH levels.²⁶

Regarding dyslipidaemia a strong risk factor for cardio and cerebrovascular disease, more than half of the cases had increased level of triglyceride (54.9%) and similarly 52.9% had normal level of total cholesterol, but high density lipoprotein (86.2%) and low density lipoprotein (80.4%) were

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in most cases within the normal range. In our study, the relation between the lipid profile and types of depression was not statistically significant. This is similar to the study by Onuegbu A.J et al where there was significant increase in plasma triglyceride in depression, irrespective of the severity of disease, and showed that plasma lipid and lipoprotein levels did not demonstrate any definite pattern with increasing level of depression in patients.³⁷ This is in contrary to the study by Stefanos Tyrovolas et al where a considerable proportion of sample (53.2%) had hypercholesterolemia and hypercholesterolemia was correlated with depressive symptomatology.³⁸ Similarly, a study by Nikolaos Dimopoulos et al was done to examine the association of plasma lipid concentrations with changes in cognitive function and depressive states in elderly Greek individuals and it showed that an association existed between the plasma concentration of cholesterol and HDL and depression and/or cognitive impairment.³⁹ In a study on elderly Finnish men (n=470) by Sinikka Aijanseppa et al, it was also found that low total serum cholesterol was associated with a high amount of depressive symptoms independently of weight change or chronic disease.⁴⁰ In a study by Jae-Min Kim et al, it was shown that lower high-density lipoprotein level (but neither hypertension nor diabetes) were significantly associated with depression (independently of disability and cognitive function).⁴¹

Conclusion

Elderly depressed patient had high burden of thyroid and lipid disorder however these disorders were not associated with severity and recurrence of depressive disorders. Besides thyroid and lipid disorder these patient has higher burden of comorbidities like hypertension and diabetes. Nonspecific clinical signs and symptoms of thyroid and lipid disorder is likely to under screen these disorder at point of care. All the elderly depressed patients are recommended to be evaluated for thyroid and lipids biochemically. All the thyroid disorder in elderly patients are recommended to be evaluated for depression.

Limitations

This is a hospital based study. This is a cross sectional study among the depressed subjects. Further studies are recommended for causal and temporal associations.

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The author declares no conflict of interest.

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