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## A study on prevalence of depression among patients suffering from systemic hypertension attending a tertiary care hospital in Tamil Nadu

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### Abstract

**Background:** Both hypertension and depression are non-communicable diseases with multiple common factors playing role in pathogenesis of both the diseases.

### Objectives

1. To find out the prevalence of depression among hypertensives attending a tertiary care hospital in Tamil Nadu.
2. To find out the association between risk factors and occurrence of depression among patients suffering from hypertension.

**Methodology:** The present study was descriptive cross-sectional study carried out among the hypertensives attending the OPD of Rajah Muthiah medical college and hospital between 2019 and 2021. Hamilton rating scale for depression was used for the diagnosis of depression.

**Results:** The prevalence of depression among hypertensives was found to be 58% with 27% having mild depression, 25% had moderate depression and 6% had severe depression. Increase in age, lower educational status, presence of comorbidities in addition to hypertension and poor compliance to treatment were found to be associated with the occurrence of hypertension among the hypertensives.

**Conclusion:** Screening of depression shall be mandated among sufferers of all NCDs. Indirect intervention of improving the educational status among the population would aid in decreasing depression among hypertensives. There was increased chance of non-compliant among those suffering from both hypertension and depression.

**Keywords:** Depression, hypertension, HAMD, compliance, education, comorbidities, age

### Introduction

Hypertension is an important public health challenge worldwide<sup>[1]</sup>. As the disease burden is shifting from that of caused by infectious agents to that of behavioural ones, Hypertension will raise to become one of the important precursor to cardiovascular diseases and also will be the main cause of death<sup>[2]</sup>. At present globally around 26.4% of the adult population was suffering from hypertension. By around 2025, hypertension was projected to have a prevalence of 29.2%, a 60% increase from the prevalence at 2000<sup>[1]</sup>.

Depression is one of the most commonly diagnosed mental disorders among adults<sup>[3]</sup>. It contributes significantly to global burden of disease. It was reported that about one in twenty people reported to have experienced a depressive episode in their life time. Depression affects around 350 million people every year<sup>[4]</sup>. It also contributes to 3% of the global disability adjusted life years<sup>[5]</sup>. The life time risk of depression was reported to be 7%<sup>[6]</sup>.

A depressive mood had been found to be associated with increase in both the systolic and diastolic blood pressure. The incidence of depression among hypertensives was considerably higher than those with normal blood pressure. The possibility of major depressive disorder was reported to be 3 times more among the hypertensives<sup>[7]</sup>. Both hypertension and depression occur due to interaction between multiple complex social, behavioural and biological factors<sup>[8]</sup>. Recent studies reported a common link between mood disorders and hypertension in their pathogenesis. Multiple genome wide association studies had reported the role of the gene locus CACNA1C that codes for the L type calcium channel. Another locus, CACNB2 that coded for voltage gated calcium channel indicated risk for both occurrence of mood disorders and hypertension<sup>[9]</sup>.

Multiple studies and literatures were available suggesting an association between depression and hypertension among the western population<sup>[5]</sup>.

The data regarding the above interaction was lacking in low and middle income countries<sup>[8]</sup>. Very few studies were done in India to establish the above association among the Indian population and also the factors playing a role in the occurrence of depression among the hypertensives. The present study aimed to find out the prevalence of depression among patients with systemic hypertension attending a tertiary care hospital and also to find out the association between selected risk factors and depression among hypertension patients.

### Methodology

The present study was descriptive cross-sectional study carried out in the out-patient department of Rajah Muthiah Medical College and Hospital, Annamalai University, Chidambaram. The study period was for a period of two years. The inclusion criteria included the presence of hypertension, age above 18 years, and absence of any major psychiatric illness. The ethical clearance for the study was obtained from the institutes ethical committee.

Total participants interviewed during the study period was 100. A semi structured proforma was used for collecting the data. Convenient sampling was adopted. The data collected consists of sociodemographic characteristics like age, sex, residence, education, occupation and socio-economic status. In order to overcome the recall bias and for more accurate collection of information, variables like age were checked up with any ID card that was present with the participant at the time of data collection.

Following sociodemographic characteristics, patient reception of social support was asked. Details regarding other comorbid conditions present along with hypertension were recorded. The diagnosis as reported by the patient were then checked up with the patients' OP record book. Following comorbidity, details regarding psychiatric morbidity in the past was collected. The same history among family members of the participants too was recorded. History of substance abuse from the patient was sought for and the details as reported by the patient was recorded. History of psychotropic utilisation of drugs was recorded. Following the above, the duration for which the participants were hypertensives was recorded followed by their treatment compliance to hypertension. Distance of their residence from home was asked for and recorded as either near or far.

Both Hamilton Rating scale for depression and ICD -10 symptom checklist for mental disorders were used for collecting information on depression and also for diagnosing depression among the participants of the study.

### Statistical analysis

The data collected were entered into Microsoft excel 2019 and the master chart thus created was loaded into social package for statistical sciences version 26. Both descriptive and inferential statistics were employed while analysing the data. All the variables were presented as qualitative variables. The quantitative variables that were there were also converted to quantitative variable for the above purpose. In order to compare the distribution of qualitative variables between the arms of the trial, chi square test was applied. A P value of less than 0.05 was considered to be significant.

### Results

Among the participants, 48% were male and 52% were females. Among the males, 41.6% belonged to age group 41 to 50 years. Among the females, 42.3% belonged to age group 41 to 50 years. 70% of the participants resided in rural area and 30% of the participants resided in urban area. 92% of the participants were married and 8% were unmarried. Among the participants, 28% had studied up to primary school and high school, respectively and 20% had studied up to degree. 73% of the participants were employed. Among the participants, 47% belonged to middle class and 39% belonged to lower class (Table 1).

42% of the participants reported to have social support. 21% of the participants had diabetes mellitus as comorbid condition, 8% had bronchial asthma and 2% had coronary artery disease. 8% of the participants were reported to have substance abuse. 45% of the participants had hypertension for the past one to five years. 24% had hypertension for less than one year. 44% of the participants had fair compliance and 31% had poor compliance (Table 2).

The proportion of participants with depression was found to be 58%. 27% had mild depression, 25% had moderate depression and 6% had severe depression (Fig 1). Among the participants suffering from depression, 55.17% belonged to age group 41 to 50 years and 25.86% belonged to age group more than 50 years. Among the participants without depression, 30.95% belonged to age group 31 to 40 years and 28.57% belonged to age group 21 to 30 years. The prevalence of depression increased in the older age group than the younger and the difference was statistically significant with P value of less than 0.05.

Among the participants suffering from depression, 48.27% were males and among those without depression 47.61% were males. Occurrence of depression and sex were not found to be associated with each other. Among the participants with depression, 34.48% lived in urban area and among those without depression, 23.81% lived in urban area. The place of residence and depression were not found to be associated with each other. Among the participants with depression, 91.37% were married and among those without depression, 92.85% were married. Marital status and depression were not found to be associated with each other among hypertensives with P value of more than 0.05.

Among the participants with depression, 46.55% had studied either primary or middle school and 20.68% had studied up to high school. Among those without depression, 38.09% had studied up to high school and 28.57% had studied up to degree. Depression was found to be higher among those with lower educational status than those with higher ones with P value of less than 0.05. Among the participants with depression, 75.86% were employed and among those without any depression, 69.04% were employed.

Employment status and occurrence of depression was not associated with each other among hypertensives with P value of more than 0.05. Among the participants with depression, 44.82% belonged to middle class and 43.10% belonged to lower class. Among those without depression, 50% belonged to middle class and 33.33% belonged to lower class. Occurrence of depression among hypertensives and socioeconomic status were not associated with each other with P value of more than 0.05.

Among the participants with depression, 34.48% had social support and among those without depression, 52.38% had social support. Social support and occurrence of depression were found to be not associated with each other with P value of more than 0.05. Among the participants with depression, 39.65% had comorbidities and among those without depression, 19.04% had comorbidities.

The presence of comorbidities among hypertensives was found to be associated with hypertension with P value of less than 0.05.

Among the participants with depression, 8.62% had reported substance abuse and among those without depression, 7.14% reported substance abuse. Substance abuse and depression were not found to be associated with each other with P value of more than 0.05. Among the participants with depression, 43.10% were having hypertension for 1 to 5 years and 25.86% were having hypertension for 6 to 10 years.

Among those without depression, 47.61% had hypertension for 1 to 5 years and 33.33% for less than 1 year. No association was found between depression and duration of illness among the participants. Among the participants with depression, 41.37% had poor compliance and 39.65% had fair compliance. Among those without depression, 50% had fair compliance and 33.33% had good compliance. Poor compliance was associated with the presence of depression

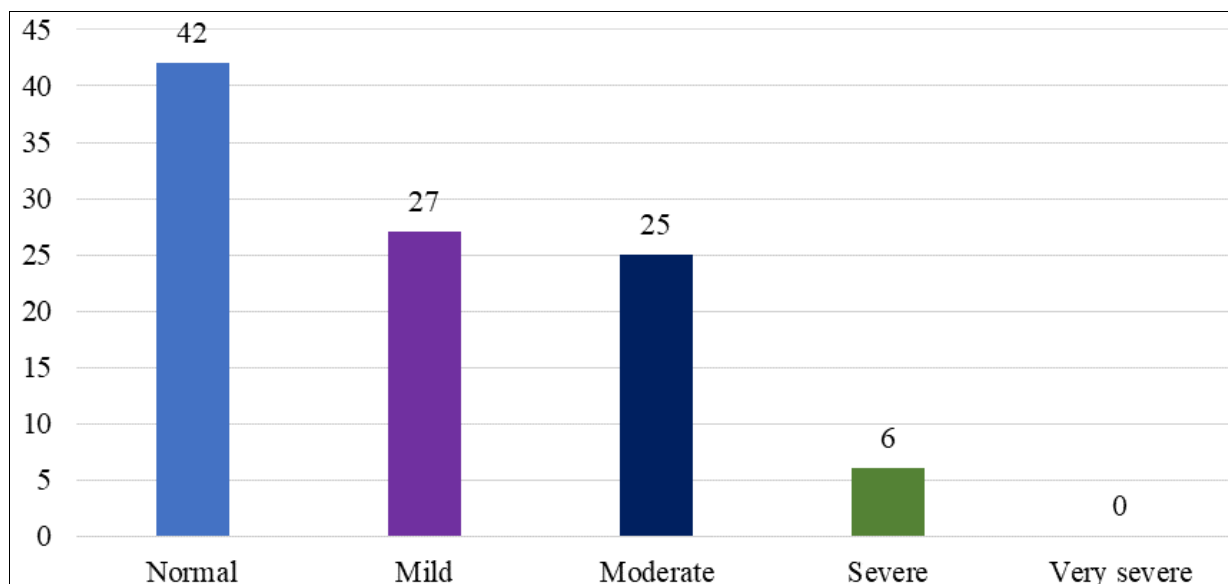
among hypertensives with P value of less than 0.05 (Table 3).

**Table 1:** Baseline characteristics of the study participants

Variable	Frequency (n=100)	
Age group (In years)	21-30	16
	31-40	20
	41-50	42
	>50	22
Sex	Male	48
	Female	52
Residence	Urban	30
	Rural	70
Marital status	Single	8
	Married	92
Educational status	Uneducated	16
	Primary	28
	Middle	8
	High school	28
	Degree	20
Occupational status	Employed	73
	Unemployed	27
Socioeconomic status	Lower	39
	Middle	47
	Upper middle	11
	Affluent	3
Substance abuse	Present	8
	Absent	92

**Table 2:** Distribution according to social support, comorbid conditions, duration of hypertension and treatment compliance

Variable	Frequency (n=100)	
Social support	Present	42
	Absent	58
Comorbid conditions	Diabetes mellitus	21
	Bronchial asthma	8
	CAD	2
	Absent	69
Duration of hypertension (In years)	< 1	24
	1-5	45
	6-10	21
	>10	10
Treatment compliance	Good	25
	Fair	44
	Poor	31



**Fig 1:** Bar chart showing distribution of pattern of depression among study participants

**Table 3:** Association between selected risk factors and the presence of depression among the hypertensives

Variables		Depression				X <sup>2</sup>	P value
		Present		Absent			
		N	%	N	%		
Age group (In years)	21-30	4	6.89	12	28.57	18.13	0.004*
	31-40	7	12.06	13	30.95		
	41-50	32	55.17	10	23.81		
	>50	15	25.86	7	16.67		
Sex	Male	28	48.27	20	47.61	0.004	0.948
	Female	30	51.72	22	52.39		
Residence	Urban	20	34.48	10	23.81	1.32	0.251
	Rural	38	65.52	32	76.19		
Marital status	Unmarried	5	8.62	3	7.14	0.072	0.788
	Married	53	91.37	39	92.85		
Educational status	Uneducated	11	18.96	5	11.91	10.32	0.015*
	Primary to middle	27	46.55	9	21.42		
	High	12	20.68	16	38.09		
	Degree	8	13.79	12	28.57		
Occupation	Employed	44	75.86	29	69.04	0.573	0.448
	Unemployed	14	24.13	13	30.95		
Socioeconomic status	Lower	25	43.10	14	33.33	1.102	0.576
	Middle	26	44.82	21	50.00		
	Upper middle class or more	7	12.06	7	16.67		
Social support	Present	20	34.48	22	52.38	3.20	0.073
	Absent	38	65.51	20	47.61		
Comorbidities	Present	23	39.65	8	19.04	4.83	0.027*
	Absent	35	60.34	34	80.95		
Substance abuse	Present	5	8.62	3	7.14	0.072	0.788
	Absent	53	91.37	39	92.85		
Duration of illness	<1	10	17.24	14	33.33	6.28	0.098
	1-5	25	43.10	20	47.61		
	6-10	15	25.86	6	14.28		
	>10	8	13.79	2	4.76		
Treatment compliance	Good	11	18.96	14	33.33	7.403	0.024*
	Fair	23	39.65	21	50.00		
	Poor	24	41.37	7	16.67		

\*Statistically significant

**Discussion**

A persistent raise in systemic arterial blood pressure is called hypertension. Depression is an emotional state characterised by ego-helplessness and ego-powerlessness. The present study was descriptive cross-sectional study done with an objective to find out the proportion of depression among those suffering from hypertension. Out of the 100 hypertensives in the study, 48% were males and 52% were females. 64% were aged more than 40 years. 70% resided in rural area. 92% were married. 28% had studied up to high school and primary school, respectively. 16% were uneducated. 73% were employed. 47% belonged to middle class followed by 39% in lower class. 42% reported that they had social support. 31% reported to have an associated comorbid condition along with hypertension. 4% reported to have past history of psychiatric comorbidity and 12% reported to have family history of psychiatric comorbidity. 8% reported positively about substance abuse. 45% had hypertension for 1 to 5 years and 24% had hypertension for less than 1 year. 44% reported to have fair treatment compliance and 25% reported to have good treatment compliance. The proportion of hypertensives suffering from depression was found to be 58% in the present study with 27% suffering from mild form, 25% moderate forms and 6% severe forms of the disease. Similar higher prevalence of depression among hypertensives was obtained by Prathibha MT *et al.* where the prevalence was reported to be 33.3% [10]. In a study done by Ashok VG and Ghosh SS, the

prevalence of depression was found to be 41%. 28.5% with mild, 7% with moderate, 3% with moderately severe depression and 2.5% suffer from severe depression [11]. A cross-sectional study among the Ghanaian and Nigerian population reported the prevalence of depression among the hypertensives to be 41.7% and 26.6%, respectively [12]. Similar result was also obtained by Kulkarni *et al.* [13]. The higher proportion in the present study could be due to the fact that the study was conducted in hospital rather than in the community. The varied range of depression reported could also be due to the different scales used by various researchers. The proportion of depression was found to be more among those with increased age than among those in the lesser age group. Neupane D *et al.* reported that with each additional year a patient lived with hypertension there was 1 point increase in the Beck Depression inventory (BDI) scale [8]. The present study found out that the depression was present more among those with lower education than among those with higher education. Similar results was also obtained by Prathibha MT *et al.* in the year 2017 where they reported that lower educational status was significantly associated with depression among those suffering from hypertension [10]. Similar association was also obtained by Mahmood S *et al.* [14]. Ma L *et al.* reported illiteracy to be a predictive factor for the occurrence of depression [15]. Depression was found to be in higher proportion among those with comorbidities than those without any

comorbidities. Gray CA *et al.* reported that person suffering from both hypertension and diabetes mellitus had 2 times increased risk of getting depression than those suffering from hypertension alone [16]. Poor treatment compliance among hypertension patients and the presence of depression were associated with one another. Similar was the finding of the study by Kretchy IA *et al.*, the study reported a poor adherence to medication among hypertension patients suffering from mental disorders [17]. Wood MK *et al.* conducted a study to find out the predictors of poor adherence among hypertensive patients. The study reported that hypertensives with depressive symptoms were two times increased risk of being non-adherent to medication [18]. Wang PS *et al.* in their study reported that among the person suffering from hypertension if there is associated depression, there was increased chance of being noncompliant to anti-hypertensive medication [19]. The proportion of depression was found to be higher among the study participants. The occurrence of depression was determined by increasing age, lower educational status, presence of comorbidities and poor treatment compliance.

### Conclusion

The proportion of persons with depression among the hypertensives was found to be higher indicating the importance of screening for depression and appropriate treatment measures among those suffering from hypertension. The proportion was even higher among those with comorbidities like diabetes, CAD along with hypertension. Indicating the importance of screening in sufferers of all NCDs. Indirect intervention of improving the educational status among the population would aid in decreasing depression among hypertensives. There was increased chance of non-compliant among those suffering from both hypertension and depression.

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