Prevalence of depression among clients with diabetes and hypertension in selected hospital at Mangaluru, India

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Abstract:

BACKGROUND: Non-communicable diseases are lifestyle diseases that are increasing throughout the world. They are responsible for 71% of death worldwide, among which 16 million people die prematurely or before reaching the age of 70 years. Among the non-communicable diseases, diabetes and hypertension are the most common. The study aimed to find the prevalence of depression among diabetes and hypertensive clients.

MATERIALS AND METHODS: A descriptive cross-sectional study was conducted among 370 subjects diagnosed with diabetes mellitus, hypertension, and both in Justice K.S Hegde Charitable Hospital at Mangaluru. A purposive sampling technique was adopted to select the subjects. Patient health questionnaire-9 (PHQ-9) was used to find the depressive symptoms among the client. The statistical analysis was conducted using SPSS version 20 (Armonk, NY: IBM Corp.); descriptive (frequency and percentage) and inferential (one-way analysis of variance (ANOVA)) statistics were used to interpret the data.

RESULTS: Out of 370 subjects, 41% had no depression, and most 59% had mild to severe levels of depression. Among clients diagnosed with diabetes mellitus ($n = 139$), the majority (63%) had mild to severe depression. Similarly, of subjects diagnosed with hypertension, 51% had no depression, and 49% had mild to severe depression. In addition, among subjects diagnosed with both diabetes mellitus and hypertension ($n = 99$), 67% had mild to severe depression.

CONCLUSIONS: The study shows that many diabetes and hypertensive patients attending the outpatient departments of the hospital experience depression. So, it is crucial to identify the depressive symptoms early and take appropriate measures to prevent complications.

Keywords:

Depression, diabetic mellitus, hypertension

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Introduction

Non-communicable diseases (NCDs) are the leading cause of death worldwide, killing 41 million people per year and contributing to 71% of total death.[1] Among non-communicable diseases, diabetes and hypertension are prevalent among the world population.[2] Globally, 26% of the population is affected by hypertension, which is estimated to increase by 29% in 2025.[3] Similarly, the global prevalence of diabetes was 8.8% and is expected to increase to 9.9% by 2045.[4]

In India, diabetes prevalence was 7.6%, in which 2.4% among men aged 18–24 years and 14% among men above 65 years. In addition, diabetes was more prevalent in South Indian states. Similarly, hypertension prevalence was found to be 26.5%. It ranges from 9.2% among women ages 18 to 25 to 48.6% among women older than 65.[5] An earlier study done in Mangaluru shows the

Wprevalence of diabetes, and hypertension was 7.6% and 41%, respectively.[6,7] Surprisingly, 40% of the men were prehypertensive, and only 18% of the population had normal blood pressure. Moreover, nearly 54% of them are unaware of their hypertension state.

In addition, mental health issues are common among patients with diabetes and hypertension.[8] Depression is a common mental illness worldwide. It is estimated that 3.8% of people worldwide are affected by depression.[9] Approximately 280 million people worldwide suffer from depression. India accounts for the second-largest country to have diabetes cases next to China. India's national mental health survey 2015–16 revealed that 15% of the Indian population suffers from one or more mental illnesses, and one in 20 Indians suffers from depression.[10] Several studies confirm the relation between hypertension and depression.[11] It also suggests that depression needs to be ruled out to manage hypertension effectively.[11,12] Lack of dopamine in the critical sites of the brain may be the common cause of increased blood pressure and depression.[12] Similarly, previous studies revealed that depression is common among patients with type 2 diabetes mellitus ranging from 15% to 24%.[13] Moreover, the coexistence of type 2 diabetes mellitus and depression will cause 1.5 times to increase the risk of mortality and be responsible for disability and morbidity.[14] In addition, a few studies conducted in India showed that the prevalence of depression in diabetes mellitus ranges from 2% to 84%, with a pooled prevalence of 34%.[15,16]

Depressive symptoms are common among newly diagnosed patients with diabetes and hypertension, so the researcher in this study took the patients who have known cases of diabetes and hypertension for more than one year. In addition, the researcher found no evidence of the relation between depression with both diabetes and hypertensive clients. However, in the present study, subjects diagnosed with and taking treatment for diabetes and hypertension more than one year were included. Moreover, the present study compares the prevalence of depression among diabetes and hypertensive clients.

To improve the outcome of diabetes and hypertension, it is essential to identify the comorbid conditions. So, the present study aims to find the prevalence of depression among diabetes and hypertensive clients.

Materials and Methods

Study design and setting
This cross-sectional study was conducted in the outpatient department of Justice K.S Hegde Hospital, Mangaluru, in 2019 to find the prevalence of depression among diabetes and hypertensive clients.

Study participants and sampling
For the present study, a purposive sampling technique was used to select the study participants. A total of 370 subjects who visited the outpatient department of Justice K.S Hegde Hospital, Mangaluru, with hypertension, diabetes, and both for more than one year were included. Patients who were currently getting treatment for depression were excluded from the study. The permission was taken from the hospital authority, and informed consent was obtained from the selected study participants. The choice to participate in the study was voluntary. The data were collected from October to November 2019.

The sample size was calculated using the single population proportion formula $(n = \dfrac{Z\alpha/2^2(p \times q)}{d^2})$. The computed sample size for the study was 362 (considering proportion, P = 38%, an allowable error, that is, d = 0.05 at 95% of the confidence interval).

Data collection tool and technique
A structured questionnaire was used to collect the patients' sociodemographic profiles, such as age, gender, level of education, occupation, marital status, place of residence, type of family, support from the family, monthly income, type of food, exercise, and personal habit. Clinical details on height, weight, and body mass index were collected. The tool was sent for content validity for seven experts, and there was a 100% agreement with all the items.

Patient health questionnaire-9 (PHQ-9) was used to assess depression among the subjects. This tool was developed by Drs. Robert L. Spitzer, Janet B.W. Williams, Kurt Kroenke, and colleagues, with an educational grant Pfizer Inc. For the study freely available, standardized Kannada version of the tool was used.[17] This tool has nine questionnaires; each item score ranges from 0 to 3. Based on the total score, the level of depression was categorized as no depression (score between 0 and 4), mild depression (score between 5 and 9), moderate depression (score 10–14), moderately severe depression (score 15–19), and severe depression (score 20–27).[18]

Cronbach's Alpha was calculated to find the reliability of the PHQ-9 tool. Computed Cronbach's Alpha of 0.88 indicates a high internal consistency level for the present sample.

Ethical consideration
For the present study, ethical approval was taken from the ethics committee of Nitte (Deemed to be a

University) (reference number: NUINS/CON/NU/ IEC/2019-20).

Result

Table 1 illustrates the sociodemographic characteristics of the study participants. Totally 370 participants were recruited for the study out of which 139 participants had hypertension, 132 participants had diabetes, and 99 participants had both diabetes and depression. Most of the participants belong to the age group of 51–60 years in hypertensive (45.35%), diabetes (36.4%), and both diabetes and hypertension group (35.4%). The majority of participants were males (64.7% in the hypertensive group, 65.2% in the diabetic group, and 63.6% in both) and from rural areas (>50% in hypertension, diabetes, and both group).

Table 2 shows that among clients diagnosed with hypertension, 36.7% had no depression, and 63.3% had mild to severe depression. Among clients diagnosed with diabetes mellitus, 50.8% had no depression, and 49.2% had mild to severe depression. In addition, of clients diagnosed with both diabetes mellitus and hypertension, 34.3% had no depression, and 65.7% had mild to severe depression.

In Table 3, one-way analysis of variance (ANOVA) was computed to compare the depression scores for the diabetes, hypertension, and both diabetes and hypertension group, which showed no significant difference in the mean scores of depression across the three groups (F = 1.864, *P* = 0.157).

Discussion

In the present study, 63.3% of hypertensive patients had mild to severe levels of depression. This was higher than the findings of previously conducted studies, which range from 20 to 41%.[19-22] However, the dissimilarity in the result may be due to the study's method of assessment and setting. The present study was carried out in the hospital's outpatient department, which may be the reason for the high prevalence of depression among hypertensive patients. In addition, self-reported questionnaires also might have been the reason for the same. The patients might have misinterpreted the hypertension symptoms with depression, such as sleep disturbance, fatigue, and poor appetite. However, in this study, severe depression was found only among 2.9% of hypertensive patients, which is comparable with the previously conducted studies in Kanyakumari and Trivandrum, India.[19,20]

This study shows that the prevalence of mild to severe depression among diabetes patients is 49.2% and 65.7% for patients having both diabetes and hypertension. This is comparable with the other studies conducted in India by Kant R *et al*. Das *R et al*. and metanalysis conducted by Hussain S *et al*., which ranged from 38 to 49%.[23-25] This confirms that the prevalence of depression is high among the Indian diabetic population. To be noted, the prevalence of depression varies worldwide among diabetic patients. For instance, a high prevalence of depression was found in the study conducted by Waleed M Sweileh *et al*., in Palestine, Alzahrani A *et al*. in Saudi Arabia, Teshome HM, and Iran by Norouzi Z *et al*.[26-28] Furthermore, a study by Abdullah D. AlKhathami *et al*. showed that the prevalence of depression in diabetic patients was 48.7% and with both diabetes and hypertension was 29.5%. Also, it showed sleep disturbance, weight change, and low income were the significant contributors to depression.[29] In contrast, less prevalence of depression was found in the studies done in Spain and China.[13,30] The high prevalence of depression among diabetes patients in this study may be due to the participants' sociodemographic characteristics, where most of them are of low socioeconomic status and have less education. In addition, many participants believed they were not getting enough support from their families.

The present study showed a significant association between exercise and depression in the hypertension group and body mass index (BMI) and depression in both hypertension and diabetes patients. Also, no significant association was found between the sociodemographic characteristics of diabetes patients and depressive symptoms. Similarly, a study conducted in Saudi Arabia by Albasheer OB *et al*. also showed no significant association with age, gender, and duration of diabetes.[31] In contrast, a study conducted by Nigus Alemnew Engidaw in Ethiopia showed that having a physical disability and poor social support was a predictor of depression in diabetes patients.[32] Also, a study by Aschner P *et al*. in developing countries showed that being female, older age, lower educational level, and poor glycemic control contributed to depression in type 2 diabetes patients.[33] Another study Ashok VG *et al*. also showed that the female gender, low socioeconomic status, and support from the family were the predictor for depression in hypertensive patients.[19] Similarly, another contradicted study also showed gender, socioeconomic status, marital status, low educational status, regular physical activity, duration of hypertension, and uncontrolled BP were significantly associated with the depression in hypertensive patients.[20] The disparity in the result may be due to the less sample size. Moreover, the study was done in a hospital setup, and a self-reported questionnaire to assess depression may be the reason for the high prevalence of depression in hypertensive and diabetes patients.

Table 1: Distribution of subjects according to demographic characteristics (*n*=370)

Sample Characteristics	Frequency (%)		
	Hypertension (*n*=139)	Diabetes (*n*=132)	Both (*n*=99)
Age			
<40	10 (7.2%)	7 (5.3%)	6 (6.1%)
41–50	21 (15.1%)	28 (21.2%)	12 (12.1%)
51–60	63 (45.3%)	48 (36.4%)	35 (35.4%)
61–70	34 (24.5%)	35 (26.5%)	30 (30.2%)
>71	11 (7.9%)	14 (10.6%)	16 (16.2%)
Gender			
Male	90 (64.7%)	86 (65.2%)	63 (63.6%)
Female	49 (35.3%)	46 (34.8%)	36 (36.4%)
Level of education			
No formal education	8 (5.8%)	14 (10.6%)	8 (8.1%)
Primary education	56 (40.3%)	61 (46.2%)	42 (42.4%)
High school	61 (43.9%)	47 (35.6%)	36 (36.4%)
PUC	13 (9.4%)	9 (6.8%)	9 (9.1%)
Graduate and above	1 (0.7%)	1 (0.8%)	4 (4.0%)
Occupation			
Govt. employee	16 (11.5%)	11 (8.3%)	14 (14.1%)
Private employee	23 (16.5%)	26 (19.7%)	19 (19.2%)
Business	38 (27.3%)	37 (28.0%)	25 (25.3%)
Daily wages	26 (18.7%)	30 (22.7%)	14 (14.1%)
Housewife	34 (24.5%)	28 (21.2%)	24 (24.2%)
Retired	2 (1.4%)	0 (0%)	3 (3.0%)
Marital status			
Married	128 (92.1%)	119 (90.2%)	90 (90.9%)
Unmarried	9 (6.5%)	9 (6.8%)	4 (4.0%)
Divorced/separated	1 (0.7%)	1 (0.8%)	3 (3.0%)
Widow/widower	1 (0.7%)	3 (2.3%)	2 (2.0%)
Place of residence			
Rural	95 (68.3%)	94 (71.2%)	58 (58.6%)
Urban	26 (18.7%)	24 (18.2%)	26 (26.3%)
Semi-urban	18 (12.9%)	14 (10.6%)	15 (15.2%)
Type of family			
Joint	34 (24.5%)	46 (34.8%)	31 (31.3%)
Nuclear	101 (72.7%)	84 (63.6%)	66 (66.7%)
Extended	1 (0.7%)	0 (0%)	1 (1.0%)
Staying alone	3 (2.2%)	2 (1.5%)	1 (1.0%)
Do you get support from the family			
No	53 (38.1%)	48 (36.4%)	31 (31.3%)
Yes	86 (61.9%)	84 (63.6%)	68 (68.7%)
Income monthly (in rupee)			
<5000	37 (26.6%)	52 (39.4%)	31 (31.3%)
5001–10000	45 (32.4%)	43 (32.6%)	30 (30.3%)
10001–15000	29 (20.9%)	19 (14.4%)	15 (15.2%)
15001–20000	12 (8.6%)	13 (9.8%)	13 (13.1%)
>20001	16 (11.5	5 (3.8%)	10 (10.1%)
Type of food			
Veg	17 (12.2%)	12 (9.1%)	8 (8.1%)
Non-veg	122 (87.8%)	120 (90.9%)	91 (91.9%)
Exercise			
No	93 (66.9%)	98 (74.2%)	66 (66.70%)
Yes	46 (33.1%)	34 (25.8%)	33 (33.3%)
Duration of Sleep			
<7	36 (25.9%)	18 (13.6%)	19 (19.2%)
8	28 (20.1%)	40 (30.3%)	19 (19.2%)
9	58 (41.7%)	63 (47.7%)	43 (43.4%)
>10	17 (12.2%)	11 (8.3%)	18 (18.2%)

Table 2: Prevalence of depression diagnosed with diabetes mellitus, hypertension, and both diabetes mellitus and hypertension according to PHQ-9 (*n*=370)

Severity of depression	Hypertension (*n*=139)		Diabetes (*n*=132)		Both (*n*=99)	
	Frequency	%	Frequency	%	Frequency	%
0–4 None	51	36.7	67	50.8	34	34.3
5–9 Mild depression	69	49.6	48	36.4	45	45.5
10–14 Moderate depression	15	10.8	10	7.6	18	18.2
15–19 Moderately severe depression	3	2.2	6	4.5	1	1.0
20–27 Severe depression	1	0.7	1	0.8	1	1.0

Table 3: Comparison of depressive symptoms across diabetes, hypertension, and both diabetes and hypertensive patients (*n*=370)

	n	Mean	Std. Deviation	*F*	*P*
Diabetes	139	5.83	3.577	1.864	0.157
Hypertension	132	5.30	4.114		
Diabetes and Hypertension	99	6.25	3.564		
Total	370	5.75	3.783		

Limitation and recommendation

A cross-sectional study was conducted to assess depression among hypertensive and diabetic patients. Also, the PHQ-9 questionnaire was used to determine depression, a widely used tool in previously done research. This study's limitation is using purposive sampling to select the study subjects in hospital setups, which may not represent the city's wider population. Also, a self-reported questionnaire might have caused respondents to be biased. Using appropriate clinical diagnostic tools might have given a more precise estimation of depression prevalence. However, despite its limitation, this study has given insight into the importance of detecting depression among diabetes and hypertensive clients.

Conclusion

The study shows that depression is prevalent among diabetes and hypertensive patients attending outpatient departments in hospitals of Mangaluru. This study emphasizes the importance of screening for mental health issues such as depression among the diabetes and hypertensive patients. Also, providing services to address the mental health needs of diabetic and hypertensive patients may help to prevent further complications. In addition, a similar study can be replicated on a larger sample for generalization of the findings. Also, a similar study can be conducted on non-communicable diseases other than diabetic mellitus and hypertension patients.

Conflicts of interest

There are no conflicts of interest.

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