Association between depression, anxiety and quality of life among patients with diabetes mellitus and/or hypertension in a tertiary care railway hospital in India: A cross-sectional study

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ABSTRACT

Introduction: Comorbid depression and anxiety have been found to be highly present in patients suffering from chronic physical illnesses such as diabetes mellitus (DM) and hypertension (HTN). These comorbid psychiatric conditions further reduce the quality of life (QOL) in the sufferers. The present study aimed to assess the association between depression, anxiety, and QOL among patients with DM and/or HTN.

Materials and Methods: This cross-sectional study was carried out in the outpatient setting of the medicine department of the tertiary care referral hospital of East Central Indian Railways. One hundred and twenty-three individuals of DM and/or HTN of more than 1-month duration were assessed for depression, anxiety, and QOL using the Hospital Anxiety and Depression Scale (HADS) and the World Health Organization QOL Brief (WHOQOL-BREF) version scale.

Results: The mean age of the sample (53.7% had HTN, 12.2% had diabetes, and 34.1% had both HTN and diabetes) which comprised 87% males was 50.20 (±6.0) years. The mean HADS (anxiety and depression) scores were 3.6 for both (range 0–14). Nearly 10.6% and 17.1% of the samples had scores above the cutoff for HADS anxiety and depression subscales. The WHOQOL-BREF scores were highest for the environmental domain and were lower for psychological, physical, and social domains. The HADS anxiety and depressive scores correlated significantly negatively with the WHOQOL-BREF physical and psychological domains. Female gender and the presence of an additional medical illness were significantly associated with higher HADS depression scores.

Conclusion: Fair proportion of patients with HTN and/or diabetes has been affected with higher anxiety and depressive scores, which predicted a poor QOL. This calls for early identification of these mental health issues in sufferers of depression and HTN, which will facilitate an early holistic management.

Key words: Anxiety, depression, diabetes mellitus, hypertension, quality of life

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INTRODUCTION

The increasing longevity of the Indian population has shifted the public health attention to noncommunicable diseases (NCDs). Diabetes mellitus (DM) and hypertension (HTN) are two most important NCDs which are associated with considerable morbidity and health-care costs. Symptoms of anxiety and depression have been reported to be frequently present in patients with diabetes and HTN. Depression affects 10%–30% of the people with diabetes worldwide. Depressive symptoms in diabetes have been associated with impaired glycemic control, poorer medication adherence, greater cardiovascular morbidity, and higher mortality. Anxiety symptoms have also been found to adversely affect diabetes as it exacerbates micro- and macrovascular complications in such patients.

HTN has also been associated with symptoms of anxiety, but its relation to depression appears contradictory. While some studies failed to find an association between HTN and depression, others found a link. Patients with HTN who proceed to develop other cardiovascular disorders tend to have higher rates of anxiety and depression. Adherence to medications may be suboptimal in patients with HTN with depression and/or anxiety, leading to impaired blood pressure control, leading to poorer cardiovascular outcomes.

Previous literature has attempted to ascertain symptoms of depression or anxiety in patients with either diabetes or HTN. However, these two disorders are quite often comorbid with each other. Furthermore, assessment of the quality of life (QOL) in the context of depressive and anxiety symptoms holds significance in estimating the burden of psychological attributes and illness characteristics in worsening the QOL. Hence, the present study attempted to assess symptoms of anxiety and depression and QOL in patients with DM and/or HTN and attempted to find the association of these symptoms with other clinical parameters.

MATERIALS AND METHODS

This cross-sectional observational study was conducted at the medicine outpatient department of the tertiary care referral hospital of the East Central Railways, which caters to employees of railways and their families having an annual footfall of approximately 2.5–3 lakhs. The sample comprised patients aged 40–75 years having Type 2 DM and/or HTN with illness duration of more than 1 month. Those with the presence of additional medical illness on treatment and those who were unwilling to participate were excluded from the study. Participants were recruited through purposive sampling, and an informed written consent was obtained from them before recruitment. The ethical clearance for the study was taken from the ethical committee of this tertiary care railway hospital.

On fulfilling the inclusion and exclusion criteria for the study, the patients were assessed for sociodemographic and clinical data using a semi-structured questionnaire. Hospital Anxiety and Depression Scale (HADS) was used to assess symptoms of anxiety and depression. QOL was measured using the World Health Organization QOL (WHOQOL-BREF)-BREF. All information was gathered from the study participants in a single sitting by a single investigator/author to maintain uniformity.

Statistical analysis was done using Statistical Package for the Social Sciences software version 20 (IBM Corporation, Armonk, New York, USA). Descriptive statistics in the form of mean, median, frequency, percentages, and standard deviation were used. Pearson correlation coefficient was used to assess the correlation of symptoms of anxiety, depression, and QOL with other clinical parameters. Exploratory analyses were done to assess the predictors of anxiety and depressive symptoms. A P < 0.05 was considered statistically significant.

RESULTS

The demographic and clinical characteristic of the 123 individuals included in the study is shown in Table 1. The mean age of the sample was 50.2 years, while a majority of the samples comprised males, educated above the 12th grade, belonged to Hindu religion, urban background, and nuclear family. All the participants were married. About 53.7% of the samples had HTN only, 12.2% had diabetes only, and 34.1% had both. The mean duration of illness and the mean duration of treatment were 88.7 months and 80.3 months, respectively. Three-fourths of the sample (77.2%) had more than 80% adherence to their prescribed medications. Nearly 24.4% of the participants reported substance use, primarily tobacco. Impaired blood pressure (53.7%) was present in more than half of the samples.

The mean HADS anxiety score was 3.6 ± 3.0, whereas the mean HADS depression score was 3.6 ± 3.0. The mean WHOQOL-BREF scores were highest for the environmental domain (13.7) and were low for physical (12.9) and social (12.9) domains. The HADS anxiety and depression scores correlated with each other (r = 0.665, P < 0.001).

The HADS anxiety scores correlated significantly negatively with the WHOQOL-BREF physical and psychological domains but not social and environmental domains [Table 2]. Similarly, HADS depression scores had significant negative correlation with WHOQOL-BREF physical, psychological, and social domains but not environmental domains. Neither age, duration of illness, duration of treatment, or the body mass index correlated with the HADS anxiety or depression scores.
Table 1: Demographic and clinical parameters of the sample

| Variable                        | Mean (SD) or n (%) |
|---------------------------------|--------------------|
| Age                             | 50.2 (6.0)         |
| Gender                          |                    |
| Male                            | 107 (87.0)         |
| Female                          | 16 (13.0)          |
| Education                       |                    |
| Up to 12th grade                | 26 (21.1)          |
| Above 12th grade                | 97 (78.9)          |
| Marital status                  |                    |
| Married                         | 123 (100)          |
| Residence                       |                    |
| Urban                           | 107 (87.0)         |
| Rural                           | 16 (13.0)          |
| Family type                     |                    |
| Alone                           | 4 (3.3)            |
| Nuclear                         | 87 (70.7)          |
| Joint/extended                  | 32 (26.0)          |
| Medical illness                 |                    |
| Hypertension only               | 66 (53.7)          |
| Diabetes only                   | 15 (12.2)          |
| Both diabetes and hypertension  | 42 (34.1)          |
| Duration of illness (months)    | 88.7 (68.5)        |
| Duration of treatment (months)  | 80.3 (62.9)        |
| Medications                     |                    |
| On antihypertensive             | 108 (87.8)         |
| On medications for diabetes     | 30 (24.4)          |
| Adherence                       |                    |
| Taking >80% of medications      | 95 (77.2)          |
| Taking 80% of medications or less| 28 (22.8)        |
| Additional medical illness      | 28 (22.8)          |
| Concurrent psychiatric illness  | 6 (4.9)            |
| Substance use                   | 30 (24.4)          |
| Tobacco                         | 20 (16.3)          |
| Alcohol                         | 10 (8.1)           |
| BMI (kg/m²)                     | 26.5 (3.7)         |
| Blood pressure, systolic more than 140 mmHg or diastolic more than 90 mmHg | 66 (53.7) |

SD – Standard deviation; BMI – Body mass index

Table 2: Correlation of depression, anxiety, and quality of life

| WHOQOL-BREF domains | HADS anxiety | HADS depression |
|---------------------|--------------|-----------------|
| Physical            | −0.325 (0.001)* | −0.407 (<0.001)* |
| Psychological       | −0.532 (<0.001)* | −0.567 (<0.001)* |
| Social              | −0.084 (0.358)  | −0.192 (0.033)*  |
| Environmental       | −0.129 (0.155)  | −0.075 (0.410)   |

*P<0.05. HADS – Hospital Anxiety and Depression Scale; WHOQOL – World Health Organization quality of life

Exploratory analyses were done to assess the predictors of anxiety and depressive symptoms. It was seen that females had significantly higher HADS depression scores as compared to males (mean 6.3 vs. 3.2, t = 2.517, P = 0.022) but not HADS anxiety scores (mean 5.8 vs. 3.2, t = 2.061, P = 0.056). The HADS anxiety and depression scores did not have a relationship with the educational group, residence, or family type. The depression and anxiety scores did not differ among the study groups, namely, HTN only, diabetes only, and both (F = 0.572, P = 0.566 and F = 1.839, P = 0.163, respectively). The presence of an additional medical condition (diabetes and HTN) was significantly associated with higher HADS depression scores (mean 5.7 vs. 3.0, t = 3.136, P = 0.004) but not HADS anxiety scores. Furthermore, the presence of substance use, adherence to treatment, and control of blood pressure was not significantly associated with HADS anxiety and depression scores.

**DISCUSSION**

In the current study, we sought to examine the presence of depression and anxiety symptoms in patients having chronic NCDs such as HTN and DM and also examine their QOL. We found that a majority (half) of our samples suffered from HTN and one-third had both the above medical conditions. About 10.6% and 17.1% of our samples scored above the cutoffs for both HADS anxiety and depression scales, respectively. The depression and anxiety scores did not differ among the study groups. This signifies that, although both these NCDs are associated with anxiety and depression independently, neither diabetes nor HTN nor, the coexistence of both these conditions is significantly more associated with depression or anxiety over the other.

A rising trend in the prevalence of both these psychiatric conditions in diabetes and HTN has been found in many studies both in India and abroad. Studies in the US and the UK have found a prevalence of depression in diabetes to be ranging from 30% to 83%.[9,10] In India, studies involving diabetic patients from different centers have found depression prevalence to range from 16.9% to 41%.[11,12] Kulkarni et al. studied the prevalence of psychiatric comorbidities in NCDs (DM, HTN, and ischemic heart disease) and found that anxiety and depression were present in 19.1% and 29.1% of the samples, respectively.[13] A similar prevalence was also found in other studies mostly from Western countries.[2,3] Around 27% of patients having diabetes were found to have depression and anxiety in another study from India.[14] The prevalence of anxiety and depression in our sample of patients suffering from HTN and DM is low in comparison to other studies which we propose to be possibly explained by the different assessment instruments, cultural variations, and focus on somatic symptoms as compared to the cognitive symptoms of anxiety and depression in the Indian setting.

With respect to sociodemographic parameters, the female gender was significantly associated with higher depression scores but not with the anxiety scores. A higher predilection for females to have depression is also found in many other studies. Kulkarni et al. reported more females from Southern India to be suffering from depression.[13] A study from Northern India also found more female diabetics to be having anxiety symptoms than their male counterpart.[15] The female endocrinological uniqueness, the social stressors faced by women, and the restrictive work roles in this country can be some of the reasons that can explain this predilection.
Health status is an important factor that significantly impacts the QOL. The major elements of health status are perceived health, especially psychological well-being, chronic illnesses, and functionality.\cite{9} Both depression and anxiety in our study had significant negative correlation with QOL. This was more with the physical, psychological, and the social domains of WHOQOL-BREF scores but not with the environmental domain. Cook and Harman tried to compare health-related QOL in mental conditions and chronic physical conditions and found that mental disorders (e.g., depression) are significantly more associated with a greater number of unhealthy days than chronic physical conditions (DM and HTN). A coexistence of both of them further increases the number of unhealthy days.\cite{16}

The current study thus shows the necessity to assess comorbid psychiatric conditions in NCDs such as HTN and DM. We propose that there is possibly a vicious cycle operating here. NCDs are associated with mood disorder such as depression and anxiety disorders which through multiple mechanisms (such as medication noncompliance, neurobiological underpinnings, and unhealthy lifestyle) increase the severity of the NCDs, further lowering the QOL. A proper assessment of psychiatric conditions in such patients would stimulate early identification and management of such psychiatric conditions, thus improving their QOL.

The current study is not without limitations. The first being subjectivity of responses that can be prone to expectancy bias. secondly, the findings relate to a single center in an urban area, thus questioning the generalizability to other settings. Furthermore, the study being cross-sectional in design can only tell about symptoms of anxiety and depression at a point of time. Whether they change with time and severity of the medical disorder would warrant further evaluation. The arbitrary fixing of the age group of 40–75 years for our sample collection is a limitation since it does not include cases who have early or late onset of these NCDs, thus again questioning generalizability to other age groups. Furthermore, we have taken an arbitrary cutoff of 80% to differentiate good from poor medication adherence which also is a mentionable limitation. The study explores a limited set of determinants, and regression analysis could not be done on the restricted sample to find predictors of anxiety and depression in the sample. The absence of a control arm in our study is also an important limitation.

CONCLUSION

The study finds a fair proportion of patients with HTN and/or diabetes to be affected by anxiety and depression, leading to a poor QOL. Further studies are needed to explore the mechanisms of how anxiety and depression cause or are produced by poor QOL (i.e., directionality of the association) and to what extent. It would be desirable to see whether change in the QOL affected symptoms of anxiety and depression.

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Conflicts of interest
There are no conflicts of interest.

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