

Research Paper

## Prevalence of depression in patients with Diabetes Mellitus Type 2 (DM) and Chronic Obstructive Pulmonary Disease (COPD)

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### ABSTRACT

**Introduction:** Depression has been bi-directionally associated with chronic medical disorders such as Diabetes Mellitus type 2(DM) and Chronic Obstructive Pulmonary Disease(COPD). Presence of depression complicates the treatment outcomes due to poor adherence to treatment regimens and is also associated with significant functional impairment ranging from impaired productivity to absenteeism. **Aims:** To estimate the prevalence of depression in patients with DM and COPD, and correlate them with socio-demographic variables. **Settings and Design:** A cross sectional hospital-based study was conducted on 30 patients having DM and 30 patients having COPD from January 2018 to June 2018. **Methods and Material:** Socio-demographic data was collected using semi-structured proforma and depression was assessed using Hamilton Depression Rating Scale (HAM-D). **Statistical analysis used:** Quantitative data is expressed in numbers and percentages. Pearson's Chi-square was applied to compare the sociodemographic correlates amongst themselves with diagnosis of DM and COPD. **Results:** Prevalence of depression in patients with DM was 63.33% and in those with COPD was 66.67%. Socio-demographically, only living status was significant with DM ( $p= 0.069$ ). Overall, most (56.41%) had mild levels of severity. **Conclusions:** In about two-thirds of patients having DM or COPD, psychiatric co-morbidity in the form of depression is present. Hospital admission due to acute exacerbation may lead to increase in depressive features. This may contribute to poor compliance to treatment of these medical illnesses subsequently. Thus, special measures for early detection and treatment of depression in patients with these medical co-morbidities should be implemented to enhance treatment outcome.

**Keywords:** Diabetes Mellitus, Chronic Obstructive Pulmonary Disease, Depression

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Chronic medical disorders (CMD) are major causes for worldwide disability and mortality. They may be accounting for 36 million deaths out of 56 million deaths from 2008. Contrary to popular beliefs, NCD is not restricted to affluent countries. They are quite common in low income countries and 80% deaths in NCD belong from here. This is particularly seen in cases with Type 2 Diabetes Mellitus (DM) and Chronic Obstructive Pulmonary Disease (COPD)(1). This significantly affects the course and outcome. When co-morbid with CMD, it is associated with significant functional impairment through reduced work functioning, absenteeism and decreased productivity(Simon et al., 2007). Depression and anxiety often complicate the treatment outcomes due to poor adherence to treatment regimens(Gonzalez et al., 2008; Simon et al., 2007). Both DM and COPD are leading causes of death worldwide. The prevalence of depression is also steadily increasing. World Health Organization (WHO) predicts it to first in global burden of disease by 2030 (Kaplan & Sadock, 1998).

Aetiologically, depression is bi-directionally associated with chronic medical illnesses(Gahlan, Rajput, Gehlawat, & Gupta, 2018; Golden et al., 2008). Pooled prevalence however shows a lower rate of 38%(Hussain, Habib, Singh, Akhtar, & Najmi, 2018). In those above the age of 60 years, it is 6%(Subramaniam et al., 2017). Thus, we can estimate that a large number of diabetic patients are also at risk to develop depression. Sleep disturbances in COPD increase depressive symptoms(De, 2012). COPD has cumulative prevalence of 72%, but this may be due to other confounding factors (De, 2011). A reasonably better estimate of prevalence is 28.4%(Chaudhary et al., 2016). One in every five COPD patients will have signs of depression(Mehta et al., 2014). This shows that evaluation of depression and anxiety, even if sub-syndromal, is essential in patients with DM and COPD. In this study, we try to estimate the prevalence of depression in such patients who are hospitalized.

### MATERIALS AND METHODS

**Participants:** This cross-sectional study was done in a tertiary hospital. Patients admitted under the department of General Medicine from 1<sup>st</sup> January 2018 to 30<sup>th</sup> June 2018 with the diagnosis of either DM or COPD from at least last three months were included. Those having any other comorbid medical/surgical diagnosis was excluded. Patients with either gender aged between 19 to 60 years were included only after obtaining informed written consent from them. We also excluded patients with symptoms suggestive of delirium and/or dementia or those who were previously diagnosed to have any psychiatric illness. Sample size of patients with DM and COPD was 30 each.

**Tools:** Sociodemographic details and clinical profile for DM and COPD were obtained through a semi-structured questionnaire. The primary investigator (PI) assessed the patients for symptoms of depression by using Hamilton Depression Rating Scale (HAM-D). HAM-D is a standardised rating scale, focussing more on somatic complaints. We chose this scale as it would be suitable to assess somatic symptoms in patients with CMD. Internal consistency of HAM-D is 0.83 and test-retest reliability is 0.93.

**Procedure:** Our objectives were to estimate the prevalence of depression in admitted patients with DM or COPD, and to correlate prevalence to sociodemographic data. Institutional Ethical clearance was obtained and any doubts regarding the questionnaire were clarified immediately. Anonymity was explained. After obtaining informed consent, PI interviewed the patients for assessments of the scales.

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**Statistical analysis:** Data collected was computed and analysed using Epi Info. Quantitative data is expressed in numbers and percentages. Pearson's Chi-square was applied to compare the sociodemographic correlates amongst themselves with diagnosis of DM and COPD.

### RESULTS

Sociodemographic correlates of DM and COPD are presented in **Table 1** and **Table 2** respectively.

**Table 1: Sociodemographic correlates for patients with DM and depression**

	No Depression	Depression	p-value
Religion			
Hindu	8	13	0.804
Muslim	3	6	
Marital Status			
Single	1	0	0.129
Married	10	13	
Divorced	0	2	
Widowed	0	4	
Education			
Illiterate	0	2	0.564
Primary School	2	4	
Middle School	2	6	
High School	5	6	
Post High School	1	1	
Graduate/ Post Graduate	1	0	
Employment Status			
Unemployed	2	6	0.260
Unskilled Worker	2	7	
Semi-Skilled Worker	4	6	
Skilled Worker	1	0	
Clerical	1	0	
Semi Profession	1	0	
Profession	0	0	
Monthly Income			
<1802	4	11	0.206
1802-5386	4	5	
5387-8988	1	3	
8989-13499	2	0	
Living With			
Parents	2	0	0.069*
Alone	0	3	
Spouse & Child	9	13	
Other	0	3	

\* = p value significant (<0.05), Pearson's Chi Square Test

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**Table 2: Sociodemographic correlates for patients with COPD and depression**

	No Depression	Depression	p-value
Gender			
Male	9 (31.0%)	20 (69.0%)	0.150
Female	1 (100.0%)	0 (0%)	
Religion			
Hindu	9 (37.5%)	15 (62.5%)	0.333
Muslim	1 (16.7%)	5 (83.3%)	
Marital Status			
Single	1 (100.0%)	0 (0%)	0.282
Married	9 (32.1%)	19 (67.9%)	
Divorced	0 (0%)	0 (0%)	
Widowed	0 (0%)	1 (100.0%)	
Education			
Illiterate	0 (0%)	3 (100.0%)	0.184
Primary School	2 (40.0%)	3 (60.0%)	
Middle School	7 (53.8%)	6 (46.2%)	
High School	1 (14.3%)	6 (85.7%)	
Post High School	0 (0%)	2 (100.0%)	
Graduate/ Post Graduate	0 (0%)	0 (0%)	
Employment Status			
Unemployed	2 (66.7%)	1 (33.3%)	0.613
Unskilled Worker	5 (29.4%)	12 (70.6%)	
Semi-Skilled Worker	3 (37.5%)	5 (62.5%)	
Skilled Worker	0 (0%)	1 (100.0%)	
Clerical	0 (0%)	1 (100.0%)	
Semi Profession	0 (0%)	0 (0%)	
Profession	0 (0%)	0 (0%)	
Monthly Income			
<1802	6 (37.5%)	10 (62.5%)	0.248
1802-5386	4 (50.0%)	4 (50.0%)	
5387-8988	0 (0%)	4 (100.0%)	
13495-17999	0 (0%)	2 (100.0%)	
Living With			
Parents	1 (100.0%)	0 (0%)	0.284
Alone	0 (0%)	1 (100.0%)	
Spouse & Child	9 (32.1%)	19 (67.9%)	
Other	0 (0%)	0 (0%)	

Prevalence of depression in patients with DM was 63.33% and in those with COPD was 66.67%. Out of the 19 patients with DM who had depression, nine had mild (47.36%), four had moderate (21.05%), four had severe (21.05%) and two had very severe levels (10.52%) of depression. Out of the 20 patients with COPD who had depression, 13 had mild (65%), six had moderate (30%) and one had very severe (5%) levels of depression.

## DISCUSSION

Prevalence of depression in DM patients have shown large variability. When Patient Health Questionnaire (PHQ-9) was applied on outpatients of DM, depression was found in only 13%

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(Dejenie Habtewold, Radie, & Sharew, 2015). Assessment on outpatients using a better tool as Major Depression Inventory (MDI) showed 38.8% of stable DM patients having depression, majority (25%) of them having mild (Mathew, Dominic, Isaac, & Jacob, 2012). When Beck's Depressive Inventory (BDI) is used on outpatients with DM, prevalence was 38.8% (Roy et al., 2018). Using gold standard HAM-D and Hamilton Anxiety Rating Scale (HAM-A) on outpatients with matched controls, one study found 26.3% had depression, 27.6% had anxiety and 21% had both depression and anxiety (Rajput, Gehlawat, Gehlan, Gupta, & Rajput, 2016). However, even using PHQ-9, higher rates of depression (63%) was found in those with duration of DM more than five years and poor glycaemic control (Bahety et al., 2017). This shows that not only appropriate scales, but current status of DM is also important while assessing for depressive symptoms.

One study found depression in 49.2% of patients of stable COPD attending outpatients. Majority of them had moderate to severe depressive illness, followed closely by mild symptoms. However, Patient Health Questionnaire (PHQ-9) was used here (12). When better tools like HAM-D and State Trait Anxiety Inventory (STAI) were used in stable outpatients, anxiety and depression was found to be in 42.6% (Biswas et al., 2017). Lower rates of depression (13.2%) and anxiety (20.6%) were seen in another study done on stable chronic respiratory illnesses patients visiting outpatient clinic. Computer assisted Global Mental Health Assessment Tool, Primary Care Version (GMHAT/PC) was used here, which again is not standardized for assessment of depression (Sharma et al., 2013). While this approach may be suitable for areas with less infrastructure, standardized assessment is emphasized in admitted patients. Current status of COPD may influence depressive symptoms. In one study, outpatients were evaluated by Hospital Anxiety and Depression Scale (HADS) as screening and then evaluation by psychiatrist. Depression was found in only 22.7%. Again, lower rate may lie within the current status of COPD. In this sample, only 17.5% of those who had psychiatric illnesses were hospitalized in the previous one year, compared to 12.5% of those without psychiatric illnesses (Dua et al., 2018). When patients with acute exacerbations were evaluated, 38.7% had depression as assessed by HADS, being the second most common comorbidity, first being gastroesophageal reflux disease (GERD) at 80% (17). Severity of COPD and psychiatric comorbidities also increase with each other (Chaudhary et al., 2016; Mehta et al., 2014).

We addressed two problems of CMD and depression in our study, use of standard scale and current status of CMD. We found prevalence of both DM and COPD to be high. About two-thirds of the patients of each group had depressive symptoms. Most (56.41%) of them had mild severity. High prevalence is seen here as we took patients who were admitted for DM or COPD. We also used HAM-D for assessment which is standardized for depression and also interviewer rated. Admitted patients in our study were those who had exacerbation, as they were already detected to have DM or COPD at least from last three months. They also tend to have more severity of the medical illnesses. Thus, they report of more depressive symptoms. Evaluation for depressive symptoms needs to be done at this stage where disability is increased. Further, adequate interventions at this period, even simple psycho-education regarding CMD and depression can have a positive impact on the outcome by improving compliance and decreasing hospital stay (Gonzalez et al., 2008; Poongothai et al., 2017; Simon et al., 2007). We did not find significant correlations of sociodemographic factors with depression, apart from "living status" in patients with DM. This implies that sociodemographic factors may not play a significant role in depressive symptoms when there is an exacerbation of CMD, or there is a need for hospital admission. Also, none of these

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patients were referred to psychiatry department of evaluation. While mild symptoms may be missed, seven patients in total (11.67%) had severe or very severe symptoms. This shows that depressive symptoms are either ignored, missed or not adequately evaluated in patients with CMD.

Evaluation of admitted patients, of most common CMD, using standardized tool are the strengths of this study. We stress on that admitted patients are more prone to develop depressive symptoms. However, a larger sample size and subsequent follow up of these patients will be useful in future. Prospective assessment and comparison of depression during stable phases and exacerbations of CMD will give us better idea regarding their association. Nonetheless, this study emphasises that every admitted patient with CMD may benefit from timely and adequate assessment of depression. This should be done with standardized scales and irrespective of their sociodemographic status. We should also take steps to bring importance of this to the notice of physicians, as addition of evaluation and intervention of depression will reduce the overall burden and disability.

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### ***Conflict of Interest***

No conflict of interests.

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