

A Study of Depression in Adult Patients with Bronchial Asthma Presenting to a Tertiary Care Hospital in Eastern India

Swapnendu Misra¹, Susmita Kundu³, Debabrata Majumder², Somenath Kundu¹, Alope Gopal Ghoshal⁴ and Ritabrata Mitra³

Departments of Pulmonary Medicine¹ and Psychiatry², Institute of Postgraduate Medical Education and Research, Department of Pulmonary Medicine³, R.G. Kar Medical College and Hospital and National Allergy Asthma and Bronchitis Institute⁴, Kolkata, India

Abstract

Background. Bronchial asthma is a serious global health problem. Depression, the most common mood disorder, is often found to be higher among people with chronic health conditions like bronchial asthma.

Methods. Patients with newly diagnosed to have bronchial asthma (n=100) who fulfilled the study criteria were evaluated for depression with Beck Depression Inventory (BDI) score. Severity and level of bronchial asthma control were determined as per Global Initiative for Asthma (GINA) guidelines. Subjective asthma severity was assessed by Perceived Control of Asthma Questionnaire. Follow-up evaluation was done after three months of asthma management with the same study tools.

Results. In our study population, 65% asthma patients showed depression on first visit (95% Confidence interval [CI] 55.65-74.35). Correlation coefficient between subjective asthma severity and severity of depression was -0.945 (p<0.001) while correlation coefficient between objective asthma severity and depression severity was 0.066 (p=0.515). In follow-up visit after asthma management 63% patients still had depression (95% CI 53.54-72.46). Correlation coefficient between objective asthma control and depression severity was 0.1 (p=0.320). Correlation coefficient between subjective asthma severity and severity of depression was -0.979 (p<0.001).

Conclusions. Our observational study suggests that depression is highly prevalent in asthma patients. There is a high inverse correlation between depression and patient's perception of asthma control. However, no significant correlation could be observed between objective measures of asthma severity and depression. [Indian J Chest Dis Allied Sci 2015;57:87-90]

Key words: Asthma, Depression, Asthma control, Severity.

Introduction

Bronchial asthma is a serious global health problem with significant health care costs, loss of productivity and reduced participation in family life.¹ Global prevalence of bronchial asthma ranges from 1% to 18% of population in different countries.¹ There has been a marked increase in the prevalence of bronchial asthma in India over the last two decades.^{2,3}

Major depressive disorder is the most common mood disorder with a life-time prevalence in general population estimated to be close to 20%.^{4,5} Depression is a debilitating disease that can cause severe functional impairment and emotional anguish. It is associated with significant income loss, absenteeism from work and increased health-care burden.

Depression appears to be particularly more common among people with chronic health impairment⁶⁻⁸ and bronchial asthma is no exception. Symptom severity and perceived control of the disease play an important role in the prevalence and severity of depressive disorders in chronic health disorders, such as bronchial asthma.

While there are studies regarding the aforementioned issues in the world literature, there is a paucity of published evidence on this topic from India. In this background the present study has been undertaken with an aim to study the occurrence of depression among patients with bronchial asthma.

Material and Methods

This cross-sectional study was conducted in patients with bronchial asthma attending the Department of Pulmonary Medicine at our tertiary care hospital at Kolkata in Eastern India over a period of one year from April 2012 to March 2013.

Patients with newly diagnosed to have bronchial asthma as per the criteria of guidelines of Global Initiative for Asthma (GINA)² older than 18 years of age who were non-smokers were considered for the study. Patients with any psychological co-morbidity other than depression, past history of mood disorder or psychotropic drug intake; patients with major depressive disorder with suicidal thoughts and/or attempts, presence of other medical illnesses like

[Received: December 12, 2013; accepted after revision: June 15, 2015]

Correspondence and reprint requests: Dr Swapnendu Misra, 38, Raj Krishno Ghoshal Road, Post Office-Kasba, Kolkata-700 042 (West Bengal), India; E-mail: swapnendu.misra@gmail.com

diabetes or cardiovascular disorders, recent use of systemic steroids for more than two weeks and life event scale (LES) score of more than 150⁹ were excluded from the study. Informed consent was taken from all the study participants. The study was approved by the Institutional Ethics Committee.

The patients were evaluated for asthma by history, clinical examination, spirometry with bronchodilator reversibility and were grouped into intermittent; mild persistent/moderate persistent/severe persistent asthma according to GINA 2006. Assessment of subjective asthma severity was done by Perceived Control of Asthma Questionnaire (PCAQ)¹⁰ which is a validated 11-item questionnaire used to predict the extent to which an asthmatic patient regards his/her own disease status as disabling. A lower score indicates poor perceived control of asthma and a higher score indicates good control.

Prevalence of depression and its severity was determined by Beck Depression Inventory (BDI) score.¹¹ The BDI is a 21-item questionnaire where each question can be scored from 0 to 3 and the final score is obtained by summing up the individual scores.

The patients were also assessed for possibility of stress-induced health break-down by LES⁹, a social readjustment rating scale of life events. Patients with an LES score of 150 points or less were selected as it means relatively low susceptibility to stress-induced health breakdown.

Patients were given management according to the grade of severity of bronchial asthma and were followed-up after three months of treatment. Patients were evaluated objectively for asthma control (controlled/partly controlled/uncontrolled) as per GINA² as well their PCAQ¹⁰ scores.

Statistical Analysis

Data entry was done in Microsoft Excel (2007) and subsequent analysis were done using Statistical Package for the Social Sciences (SPSS; version 20) statistical software. The association of subjective and objective measures of severity of bronchial asthma with severity of depression was tested by Spearman's rank correlation coefficient rho. Correlation coefficient rho is a non-parametric measure of statistical dependence between two variables. It assesses how well a relationship between two variables can be described.

Table 1. Beck depression inventory (BDI) score in 100 patients with bronchial asthma at the time of initial presentation and at three months of follow-up

| BDI Score | Severity of Depression | At the Time of Initial Presentation (No. of Patients) | At 3 Months of Follow-up (No. of Patients) |
|-----------|--------------------------------|--|---|
| 1-10 | Normal | 35 | 37 |
| 11-16 | Mild mood disturbance | 23 | 24 |
| 17-20 | Borderline clinical depression | 12 | 16 |
| 21-30 | Moderate depression | 20 | 14 |
| 31-40 | Severe depression | 9 | 8 |
| > 40 | Extreme depression | 1 | 1 |

Analysis has been two-tailed; a p-value <0.05 was considered as statistically significant; 95% confidence intervals (CI) are presented where deemed relevant.

Results

One hundred newly diagnosed patients with bronchial asthma were studied. Their mean age was 38±12.5 years; there were 53 males. At the time of initial visit, 35 patients had mild persistent asthma, 33% had intermittent asthma and 32% had moderate persistent asthma. At the time of initial presentation, 65% (95% CI 55.7-74.4) of asthma patients had depression.

Moderate to severe depression was evident in 30% of cases (Table 1). Mean BDI score among intermittent, mild persistent and moderate persistent asthma was 16.1, 15.2 and 15.9, respectively. Moderate to severe depression was seen among 30.3% cases of intermittent asthma, 31.4% cases of mild persistent asthma and 28.1% cases of moderate persistent asthma. Mild mood disturbance and borderline clinical depression was seen in 36.4% cases of intermittent asthma, 28.6% cases of mild persistent and 40.6% of moderate persistent asthma (Figure 1).

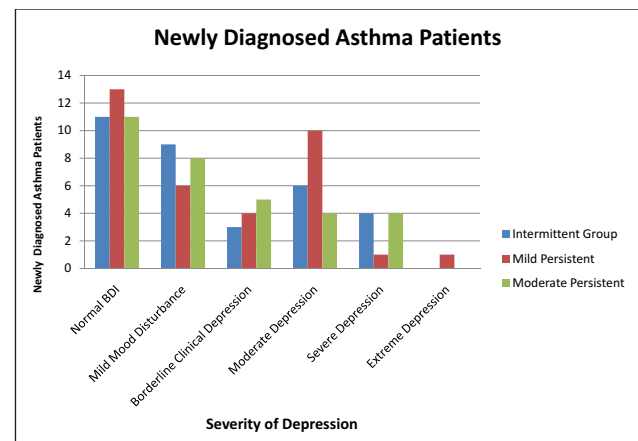


Figure 1. Severity of depression in newly diagnosed cases with bronchial asthma.

Mean initial PCAQ score was 36.3. A significant negative correlation was observed between PCAQ score and BDI score ($r=-0.945$; $p<0.001$) and a positive correlation was observed between objective asthma severity and BDI score ($r=0.066$; $p=0.515$).

At follow-up visit after three months of asthma

management, 68% patients had controlled asthma and 32% had partly controlled asthma. However, 63% patients still showed depression (95% CI 53.5-72.5) and 23% had moderate to severe depression (Figure 2). Mean BDI score among patients with controlled asthma was 14.8 ± 9.6 and among partly controlled asthma was 15.1 ± 8.3 . A significant correlation was observed between PCAQ score and BDI score was ($r = -0.979$; $p < 0.001$) and a positive correlation was observed between objective asthma control and BDI score ($r = 0.1$; $p = 0.320$).

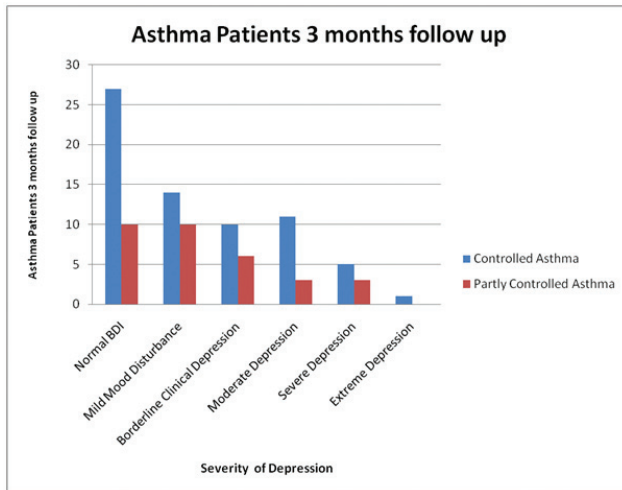


Figure 2. Severity of depression after 3 months of asthma management.

Discussion

Both asthma and depression are common medical conditions. In the recent years, there has been a resurgence of interest in the relationship between asthma and depression. In a recently published study,¹² 19% of adults with physician diagnosed asthma met the criteria for either depressive disorder or depressive disorder plus anxiety disorder. In this study¹² every asthma patient ($n = 504$) underwent a psychiatric interview using primary care evaluation for mental disorders. They also concluded that depressive disorder have a negative impact on asthma control and quality of life.

In another study¹³ no significant difference was observed in the prevalence of depressive symptoms between asthma patients and normal controls. However, the sample size in this study was small ($n = 40$) and the authors had used a different scale (Geriatric Depression Scale)¹⁴ for evaluation of depression.¹³

In the current study, depression was evaluated in patients with bronchial asthma using BDI score. High prevalence of depression even after asthma management indicate that objective asthma control may not have significant effect on the prevalence of depression. In this study, all the cases with past history of mood disorder or any other psychological co-

morbidity, as well as other forms of mental illness and stressors like other chronic medical or surgical illness or impairment have been excluded. None of the subjects in the study experienced any significant life event during the 6-month period prior to and during the study. These facts taken together indicate that the high prevalence of depression seen among the study cases is the result of the bronchial asthma.

Our study also showed a significant negative correlation between perceived asthma control and depression severity ($r = -0.945$, $p < 0.001$ in first visit and $r = 0.979$, $p < 0.001$ at the time of follow-up visit) but no significant correlation was found between objective measures of asthma severity and control with severity of depression ($r = 0.066$, $p = 0.515$ in first visit and $r = 0.1$, $p = 0.320$ at the time of follow-up visit).

It has been reported that more severe asthma leads to increased severity of depression in paediatric patients.¹⁵ A study¹⁶ evaluating patients using Hospital Anxiety and Depression Scale¹⁷, concluded that there was no significant correlation between objective asthma related variables and depression. In the present study we also found similar findings.

Some studies have analysed correlation between asthma control and depression. In a study¹⁸ patients were evaluated for depression using Geriatric Depression Scale¹⁴ and asthma control was evaluated by Asthma Control Questionnaire.¹⁹ The authors¹⁸ found that physician reported depressive disorders were associated with asthma severity but not with asthma control.

There are some studies showing the relationship between perceived control of asthma and depression. "Perceived control of asthma" is defined as individuals' perceptions of their ability to deal with asthma and its exacerbations. Bronchial asthma patients with less perceived control of the disease and more perceived severity of the disease have more chances of suffering from the depression.

In a study²⁰, lower perceived control of asthma exhibited most consistent association with depression (measured by Centre for Epidemiologic Depression Scale)²¹. In this study,²⁰ lower perceived control at follow-up was associated with depression onset.

In the present study, both in the first visit and follow-up visit, there was a strong inverse correlation between perceived control of asthma and depression severity. Stressors can be objective or subjective according to the theory of psychosocial aetiology of depression. Objective stressors are real events (e.g., bereavement, chronic illness etc.) whereas subjective stressors denote the extent to which a person is affected by that real event which later can be variable in severity. It is known that subjective stressor is a more important risk factor for depression than an objective stressor.²⁰ Existence of asthma and its severity are examples of objective stressors but the extent to which an asthmatic patient

regards his or her disease status disabling is an example of subjective stressor. Therefore, those who perceive their present illness condition as more disabling have a tendency to amplify the stressor experience and this can lead to higher severity of depression in these subjects as reflected by the current study as well as other past studies.

Conclusions

The findings of the present study suggest that every asthma patient should be evaluated for depression as it is a common co-morbid condition. Co-existence of asthma and depression increases the severity of each other. Presence of depression in a patient with bronchial asthma leads to poor asthma control and quality of life. Early diagnosis and management of depression in asthma patients will break this vicious cycle and will lead to better outcome of both the diseases. It will also reduce social burden and economic burden in a developing country like India. Therefore, evaluation and management of depression as a co-morbidity should be incorporated in every asthma management guidelines.

Our study has some limitations. As the study was done in a single tertiary care institution, the results might not be generalisable to other places. Being an observational study, it limits the ability to conclude the definite causative relationship between asthma control and depression. The study was done with a relatively smaller cohort of patients. Study duration was one year and we could make only one follow-up after three months. The present investigators suggest a bigger cohort of asthma patients with a longer follow-up to explore such questions.

References

- Masoli M, Fabian D, Holt S, Beasley R. The global burden of asthma: executive summary of the GINA dissemination committee report. *Allergy* 2004;59:469–78.
- GINA-Asthma.org (homepage on the Internet). USA: National Heart, Lung and Blood Institute and World Health Organization. (Updated 2011). Available from URL: <http://www.ginasthma.org>. Accessed on January 12, 2012.
- Matthew Masoli, Denise Fabian, Shaun Holt, Richard Beasley, editors. *The Global Burden of Asthma report Southern Asia, Developed for Global Initiative for Asthma (GINA)* (monograph on the Internet). Wellington and Southampton (Cited 2009). Available from URL: <http://www.ginasthma.org>. Accessed on January 12, 2012.
- Kessler RC, McGonagle KA, Zhao S, Nelson CB, Hughes M, Eshleman S, et al. Lifetime and 12 months prevalence of DSM – III – R psychiatric disorders in the United States: results from the National Comorbidity Survey. *Arch Gen Psychiatry* 1994;51:8–19.
- Kessler RC, Nelson CB, McGonagle KA, Liu J, Swartz M, Blazer DG. Comorbidity of DSM – III – R major depressive disorders in the general population: results from the US National Comorbidity Survey. *Br J Psychiatry* 1996;168(Suppl. 30):17–30.
- Rodin J. Aging and health: effects of the sense of control. *Science* 1986;233:1271–76.
- Wells K, Golding J, Burnam M. Psychiatric disorder in a sample of the general population with and without chronic medical conditions. *Am J Psychiatry* 1988;145:976–81.
- Katz PP, Yelin EH. Prevalence and correlates of depressive symptoms among persons with rheumatoid arthritis. *J Rheumatol* 1993;20:790–6.
- Holmes TH, Rahe RH. The social readjustment rating scale. *J Psychosom Res* 1967;11:213–8.
- Katz PP, Yelin EH, Eisner MD, Blanc PD. Perceived control of asthma and quality of life among adults with asthma. *Ann Allergy Asthma Immunol* 2002;89:251–8.
- Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Arch Gen Psychiatry* 1961;4:561–71.
- Lavoie KL, Bacon SL, Barone S, Cartier A, Ditto B, Labrecque M. What is worse for asthma control and quality of life: depressive disorders, anxiety disorders, or both? *Chest* 2006;130:1039–47.
- Dyer CAE, Sinclair AJ. A hospital-based case-control study of quality of life in older asthmatics. *Eur Respir J* 1997;10:337–41.
- Yesavage JA, Brink TL, Rose TL, Lum O, Huang V, Adey M, et al. Development and validation of a geriatric depression screening scale: a preliminary report. *J Psychiatr Res* 1982-1983;17:37–49.
- Mrazek DA. Psychiatric complications of pediatric asthma. *Ann Allergy* 1992;69:285–90.
- Janson C, Bjornsson E, Hetta J, Boman G. Anxiety and depression in relation to respiratory symptoms and asthma. *Am J Respir Crit Care Med* 1994;149:930–4.
- Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand* 1983;67:361–70.
- Mancuso CA, Wenderoth S, Westermann H, Choi TN, Briggs WM, Charlson ME. Patient reported and physician reported depressive conditions in relation to asthma severity and control. *Chest* 2008;133:1142–8.
- Juniper EF, O'Byrne PM, Guyatt GH, Ferrie PJ, King DR. Development and validation of a questionnaire to measure asthma control. *Eur Respir J* 1999;14:902–7.
- Katz PP, Morris A, Julian L, Omachi T, Yelin EH, Eisner MD, et al. Onset of depressive symptoms among adults with asthma: results from a longitudinal observational cohort. *Primary Care Respir J* 2010;19:223–30.
- Radloff LS. The CES-D scale: a self report depression scale for research in the general population. *Appl Psychol Measurement* 1997;1:385–401.
- Reno RM, Halaris AE. The relationship between life stress and depression in an endogenous sample. *Compr Psychiatry* 1990;31:25–33.