

Multiple Chronic Conditions and Asthma: Implications for Practice and Research

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At least half of US adults with asthma have at least 1 other chronic condition. Having asthma and other chronic conditions are associated with poorer asthma outcomes. Several studies considered the relationship between asthma and other specific chronic conditions; results of these studies indicated that having depression or anxiety and/or panic disorder is associated with an increased risk of developing a new asthma diagnosis and with poorer asthma outcomes. In addition, results of these studies indicated that having asthma is associated with an increased risk of developing a new depression or anxiety and/or panic disorder diagnosis. Theoretical models for understanding multiple chronic conditions have emerged, with models that include a balance between patient workload and capacity; classification of specific conditions as concordant and/or discordant and/or dominant; and identification of the gap between what a patient needs and what health care services are able to offer. Potential implications for clinical providers include screening for chronic conditions not yet recognized, such as mental health disorders, promoting and tracking medication adherence in those who have multiple chronic conditions, and simplifying treatment regimens to reduce patient workload. © 2014 American Academy of Allergy, Asthma & Immunology (J Allergy Clin Immunol Pract 2014;2:518-24)

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WHY IS UNDERSTANDING THE RELATIONSHIP BETWEEN ASTHMA AND OTHER CHRONIC CONDITIONS IMPORTANT?

In the United States, almost 50% of the population had at least 1 chronic condition in 2012, and more than 26% of the population had 2 to 3 chronic conditions.¹ When focusing specifically on asthma, 26% of individuals with asthma have at least 1 other chronic condition and 10% have 3 or more other chronic conditions.² Similarly, 26% of Germans who have asthma have at least 1 other chronic condition, and 17% had 2 or more conditions,³ and 21% of Spaniards who have asthma

have at least 1 other chronic condition and 20% had 2 or more.⁴ Most studies of multiple chronic conditions (MCC) focused on chronic conditions, such as hypertension, hyperlipidemia, arthritis, cancer, kidney failure, heart disease, and stroke. In a review of asthma and comorbidities, expert allergist/immunologists describe many disorders, such as allergic rhinitis (AR), chronic rhinosinusitis (CRS), gastroesophageal reflux disease (GERD), chronic obstructive pulmonary disease (COPD), obesity, and vocal cord dysfunction, that may make asthma more difficult to manage, many of which have not been previously considered a chronic condition in study designs focused on the most common chronic conditions.⁵ Therefore, these previous studies likely underestimate the prevalence and potential impact of having asthma and other chronic conditions.

Understanding how to best deliver asthma care to individuals who have asthma and other chronic conditions is an ongoing endeavor.⁶ In this article, we review what is currently known about the relationship between asthma and other chronic conditions, discuss the clinical implications of the relationship between asthma and other chronic conditions, and describe a potential framework for studying individuals with asthma and other chronic conditions.

THE ASSOCIATION BETWEEN ASTHMA AND THE CUMULATIVE NUMBER OF CHRONIC CONDITIONS

Individuals who have MCCs have poorer health outcomes, including poorer quality of life and higher rates of emergency department visits, than those with only a single chronic condition.^{2,7} Among patients with asthma in the United States, up to 20% of emergency department visits are attributable to having MCCs.² In the German Health Update survey, the adjusted odds ratio (OR) of unscheduled inpatient asthma care in those patients with 3 or more chronic conditions compared with those with asthma alone was 3.40 (1.39-8.31) and for unscheduled outpatient asthma care was 2.32 (1.30-4.14).³ The interaction between asthma, obesity, and depression was studied in a prospective Norwegian cohort; having anxiety or depression was associated with an increased OR of newly diagnosed asthma (1.39 [95% CI, 1.09-1.78]), which increased further if obesity

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Abbreviations used

AR- Allergic rhinitis
 COPD- Chronic obstructive pulmonary disease
 CRS- Chronic rhinosinusitis
 ED- Emergency department
 GERD- Gastroesophageal reflux disease
 HR- Hazard ratio
 ICD-9- International Classification of Diseases, Ninth Revision
 MCC- Multiple chronic condition
 OR- Odds ratio
 RR- Relative risk

also was present (2.93 [95% CI, 2.20-3.91]).⁸ In Finland, having asthma and another chronic condition were found to increase the hazard ratio of work disability; for asthma alone, the likelihood was 1.8 (95% CI, 1.62-2.09) (compared with the general population); for asthma and 1 other chronic condition, it was 2.2 (95% CI, 1.78-2.83); and, for asthma and 2 other chronic conditions, it was 4.5 (95% CI, 2.98-6.78).⁹ Results of these studies indicate that the cumulative number of chronic conditions impacts the rate of newly developed asthma; specific asthma outcomes; and general outcomes, for example, disability.

WHAT IS CURRENTLY KNOWN ABOUT THE RELATIONSHIP BETWEEN ASTHMA AND OTHER SPECIFIC CHRONIC CONDITIONS?

Mental illness: depression, and anxiety and/or panic disorder

We identified several prospective studies that addressed the relationship between asthma and mental illnesses. In a 20-year prospective cohort study, active asthma predicted subsequent panic attacks (OR 4.0 [95% CI, 1.7-9.3]), and panic attacks predicted subsequent asthma activity (OR 6.3 [95% CI, 2.8-14.0]).¹⁰ In addition, a dose-response effect of asthma and panic severity was measured, which supported the investigators' contention that each condition negatively affected the other.¹⁰ Results of another prospective study found an increase in newly developed asthma among those with baseline depressive symptoms (hazard ratio [HR] 1.25 [95% CI, 1.02-1.56]) but no increase in newly developed depressive symptoms among those with asthma (HR 0.92 [95% CI, 0.70-1.20]).¹¹ Another prospective study found that adolescents with baseline asthma had a higher risk of developing major depression (HR 1.81 [95% CI, 1.14-2.89]) and bipolar disorder (HR 2.27 [95% CI, 1.01-5.07]).¹² Baseline depression was associated with an elevated incidence ratio for asthma of 2.08 (95% CI, 1.58-2.74) among African American women.¹³ A prospective cohort recruited after hospitalization for asthma found that depressive symptoms were associated with increased risk of rehospitalization for asthma, HR 1.45 (95% CI, 1.05-2.0).¹⁴ A prospective 12-month study found an increased relative risk of 2.33 (95% CI, 2.50-3.61) for emergency department and unplanned visits of individuals with baseline anxiety and depression compared with individuals without baseline anxiety and depression.¹⁵ The time to first asthma exacerbation, unplanned visit for asthma, and emergency department visit for asthma were all significantly shorter for individuals with anxiety and depression.¹⁵

A prospective 3-year study found that the prevalence of asthma increased with baseline depressive symptoms; decreased

with social support; and was independent of smoking, alcohol consumption, body mass index, and physical exercise.¹⁶ A longitudinal cohort interviewed every 2 years for 8 years found an elevated HR of 2.1 (95% CI, 1.6-3.0) for newly diagnosed asthma of individuals with baseline depression.¹⁷ A historic cohort-nested case control study found the incident rate ratio of asthma of those with and those without depression to be 1.59 (95% CI, 1.48-1.71) but that having depression was not associated with asthma severity or corticosteroid use.¹⁸ In addition, the age- and sex-adjusted mortality ratio for individuals with depression and asthma was 1.87 (95% CI, 1.54-2.27).¹⁸

There are several cross-sectional studies that identified associations between asthma and mental illness. In Canada, the most prevalent chronic condition associated with asthma is depression (25%).¹⁹ Also in Canada, other respiratory disease and mental health disorders were associated with asthma and, not surprisingly, with a general increase in health care utilization for all respiratory diseases.²⁰ The 2006 Spanish National Health Survey found a prevalence of 9.7% anxiety and 9.0% depression, both significantly higher in asthma compared with the general population.²¹ Also in Spain, a cross-sectional study of 2 clinics found an association between poor asthma control and anxiety and depression.²² In the Israel National Health Interview Survey, 37.4% of persons with asthma had depressive symptoms compared with 21.8% of persons without asthma (OR 1.8, [95% CI, 1.5-2.3]).²³ Depressive symptoms of asthma were associated with physical inactivity, smoking, and less sleep.²³ Also, in Israel, a case control study identified hypertension, diabetes, and hiatal hernia and/or gastroesophageal reflux disease as the most commonly associated chronic conditions with asthma.²⁴ In a worldwide survey of 17 countries, a higher OR for depression (OR 1.6 [95% CI, 1.4-1.8]), anxiety (OR 1.5 [95% CI, 1.4-1.7]), and alcohol use disorders (OR 1.7 [95% CI, 1.4-2.1]) were noted in those with asthma compared with those without asthma.²⁵

In another worldwide survey, of 57 countries, asthma was associated with major depression, with similar findings for all continents.²⁶ A systematic review of mental health disorders and costs in asthma found increased emergency department visits of those patients with mood disorders or anxiety.²⁷ Comorbid depression in older adults with asthma is associated with poorer asthma quality of life and poorer asthma control.²⁸ A cross-sectional US-based study found that asthma was associated with current depressive symptoms (OR 1.41 [95% CI, 1.16-1.70]) and a lifetime history of depression (OR 1.66 [95% CI, 1.40-1.95]) but that lung function testing and asthma medication use was independent of any depression measure.²⁹ Analysis of these findings suggest that depression may not be related to asthma disease severity, which led the investigators to suggest that all individuals with asthma may benefit from depression screening.

Respiratory diseases: AR, CRS, and COPD

The relative risk of newly diagnosed asthma of those patients who have baseline AR is 3.53 (95% CI, 2.11-5.91), based on a large respiratory health survey in Europe³⁰; other prospective studies described the close relationship between AR and asthma.³¹⁻³³ When using an Italian database, 1 of the most-common comorbid conditions associated with asthma was AR (18.5%).³⁴ In Finland, asthma and COPD overlap was associated with poorer quality of life compared with those patients with asthma alone.³⁵ COPD and asthma overlap considerably, which makes diagnosis and classification challenging,³⁶ and

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