

Asthma: The Basics

Asthma is a chronic, non-communicable, inflammatory disorder in which inhaled substances cause the airways to become hyper-responsive. This reaction causes the muscles of the airways to tighten, narrowing the breathing passages and restricting ventilation. Asthma triggers vary from person to person, but are most commonly caused by allergens (e.g. dust mites, pollen, pet dander), irritants (e.g. tobacco smoke, chemical exposure, strong odours), respiratory illness (e.g. cold, flu, sinus infections), exercise, strong emotions, and medicines.¹ Symptoms typically include chest tightness, coughing, shortness of breath, and wheezing.

Asthma: Economic Cost in Europe

Precise statistics on the prevalence of asthma are not available because of inconsistent criteria for identifying asthma, as well as a lack of information from less developed countries. As many as 334 million people worldwide suffer from asthma-related symptoms.² Approximately one in every eight (30 to 40 million) asthmatics live in Europe, a disease burden which is estimated to account for over €19 billion in economic costs (including indirect costs arising from lost productivity) for people between 15 and 64 years of age.³ The average cost associated with asthma is roughly €1,650 per patient per year, but this varies widely depending on the severity of the symptoms, with uncontrolled asthma costing as much as five times more than controlled asthma.⁴ Hospital admissions and reported costs also vary widely by country, which may be because of environmental triggers in different climates or due to differences in how costs are measured and reported. The available data indicates that asthma contributes to 0.6% of hospital admissions and 0.4% of all deaths in the European Union.^{5, 6}

Asthma, Sex/Gender and Age

There is good evidence for the existence of sex and gender differences in the prevalence of asthma. Pre-pubescent boys are more likely than girls to develop asthma but after puberty this gap is reversed. Data indicates that women are between 1.8 and 2.8 times more likely to suffer from asthma than men.^{7,8} In addition, severe complications from asthma are more common in women than in men, leading to more frequent and/or longer hospitalisation and higher rates of death for female asthmatics.^{6,7,8} Women therefore bear a disproportionate share of the economic costs, with female hospitalisation rates that are, on average, 70% higher than those of males.⁹ According to the World Health Organization (WHO), women have slightly higher incidents of asthma-related deaths (1.5 deaths per 100,000 female inhabitants) than do men (1.2 deaths per 100,000 male inhabitants).¹⁰

In adulthood, women are affected much more often than men by both uncontrolled asthma (at a rate of four to one) and controlled asthma (at a rate of six to one),¹¹ with women 20-50 years of age being the most at-risk. Women have a higher rate of non-allergic asthma, asthma that is not triggered by inhaling allergens, occurring in 65% of new-onset cases in women compared to 37% of new-onset cases in men. The reasons for these sex and gender differences are not entirely understood, though research has identified possible links to airway anatomy.¹²

With respect to seeking treatment a final important gender difference emerges: women are more likely than men to identify their asthma symptoms, report them to a doctor, and to seek medical care during an asthmatic episode.²⁵

Environmental Exposure and Socio-Economic Factors

Environmental exposures, both indoor and outdoor, influence the likelihood of developing asthma, along with its severity.

Traditional gender roles continue to result in women having a disproportionate share of household responsibilities. Since women habitually spend more time at home, they are exposed to more domestic asthma triggers than are men. Examples of such triggers include, but are not limited to, allergens (pet dander, dust, fungus, mould, and yeasts) and sensitising agents (cleaning materials and household sprays). As a result of this exposure, work performed by women in the home is associated with elevated rates of asthma. Female personal care products, such as perfumes, scented personal care products, and cosmetics, can also trigger asthma.¹³

Outdoor environmental factors can also seriously impact the development and severity of asthma in women. Outdoor air pollutants that affect asthma include particulate matter, ozone, nitrogen dioxide, sulphur dioxide, and pollen allergens.¹⁴ Women with asthma are advised to avoid exertion outdoors when these airborne triggers are present at elevated levels.¹⁵

Smoking is another environmental factor that contributes heavily to the prevalence of asthma. People with asthma have hyper-responsive airways that are prone to inflammation and when a trigger (such as cigarette smoke) is present, airways narrow and produce mucus, restricting breathing. Because women tend to have narrower airways than men, these asthmatic reactions make women more likely than men to experience respiratory symptoms from tobacco smoke. Studies suggest that women who have late-onset asthma have a past history of tobacco smoke exposure, either first-hand

or second-hand.¹⁶ Asthmatics are strongly advised to avoid all forms of tobacco smoke in order to avoid the symptoms associated with this chronic disease.

Being a member of a disadvantaged socioeconomic group (where socioeconomic status is measured by education, occupation, and income¹⁷) is correlated with poorer health in general. Asthma is one of the many chronic diseases that individuals from lower socioeconomic groups are more likely to suffer from. Both inner-cities and disadvantaged neighbourhoods have greater triggers (crowding, air pollution, sanitation services, etc.) than relatively cleaner, less dense, suburban areas where more affluent individuals tend to live. Due to occupational segregation and the gender income gap, women are on average more likely to have a lower socioeconomic status. As a result, they are at increased risk of developing asthma. Further, these same socioeconomic conditions can also affect women's access to quality medical care.¹⁸

Asthma and the Influence of Hormones

There is a higher occurrence of asthma in boys than in girls before puberty. Other risk factors for the development of asthma during childhood include decreased lung function in infancy, environmental tobacco smoke (exposure to first-hand, second-hand, and third-hand smoke), exposure to animals, socio-economic status, the use of antibiotics, and infections.¹⁹

After puberty, however, women are more likely than men to have asthma.^{20,21} Puberty is the life stage when a child becomes sexually mature, characterised by the release of hormones that work differently in the male and female body. The hormonal changes experienced during puberty may have an effect on a pubescent girl's asthma. A transitioning girl might experience stronger allergic responses, feel heightened emotions, and notice altered sleep patterns.²² Asthma may be more difficult to manage during puberty.

While there is no conclusive explanation for this shift, a number of studies have linked asthmatic sex/gender differences to hormonal factors. Some of the most compelling evidence supporting the role of sex hormones in developing asthma is the worsening of asthma symptoms in the premenstrual period. Research shows that approximately one-third of women with asthma experience exacerbation of respiratory symptoms in the days leading up to and/or during their menstrual cycle.^{23,24} This is likely because reductions in oestrogen levels during menstruation can trigger inflammation of the airways, making it prudent for women to avoid exposure to known triggers during this time. During puberty, girls may find that their asthma worsens before their cycle, though its frequency and severity may lessen with age.^{16,17,18}

Many experts believe that the regulation and expression of specific genes correlate with asthma in women but not in men. Continued studies are needed to better understand hormonal influence on asthma, but the data are confounded by factors such as age and obesity. Further research is required to clarify these relationships and to identify the specific hormones and genes which aggravate the disease in women.

Asthma and Pregnancy

Symptoms of asthma can vary during pregnancy. One-third of women report their that asthma worsens, one-third report their that asthma improves, and one-third report their that asthma remains unchanged.^{25,26}

Controlled asthma rarely causes complications during pregnancy. Severe, uncontrolled asthma, however, poses a health threat to both the mother and the foetus. Uncontrolled asthma decreases the mother's blood oxygen levels thus reducing the supply of oxygen available to the developing foetus. This condition may lead to impaired foetal development. Complications to the mother include high blood pressure, toxæmia, premature delivery, and preeclampsia.

To better control asthma while pregnant, doctors recommended avoiding known triggers and working with a trusted medical professional. Though most asthma medications are safe to use during pregnancy, the women should consult with their doctors as to whether an adjustment of medications is required.

If a woman is planning a pregnancy or is pregnant, she should immediately quit smoking. Smoking during pregnancy increases the risk of the child developing asthma, even when the child is not exposed to second-hand smoke after birth. Children exposed to smoking in the womb were two-thirds more likely to have asthma by age six compared to children whose mothers did not smoke during pregnancy. Smoking during the first trimester only also results in a higher risk of asthma for children, which underscores the importance for women who are planning to become pregnant to quit smoking prior to doing so.³¹

Asthma, Perimenopause and Menopause

Perimenopause refers to the time leading up to menopause, which is defined as the end of a women's reproductive period, often marked by the end of menstruation. Women experience different reactions during this time, with some finding that their asthma symptoms improve while others find that their symptoms worsen. Some studies indicate that approximately 18% of female asthma cases first occur during the perimenopausal stage.²⁷ However, meta-analytic evidence finds no significant association of menopause with asthma prevalence or incidence, except for women using Hormone Replacement Therapy (HRT) to manage the symptoms of menopause.

HRT replaces the hormones that are no longer produced after menopause. Some studies show that HRT may be linked to an increase risk of developing asthma. However such studies are limited and further research is needed to provide robust analyses of the association of menopause and asthma.³²

Co-morbidities

The prevalence of co-morbidities (the simultaneous existence of two medical conditions, and interactions between the two can affect the prognosis of both) is greater among women with severe, uncontrolled asthma. Some of the most common reported asthma comorbid conditions include gastroesophageal disease, rhinosinusitis, obstructive sleep apnoea, and osteoporosis.

Gastroesophageal Reflux Disease (GERD). GERD triggers asthma symptoms.²⁸ Some researchers believe that asthma flare-ups cause the lower oesophageal sphincter to relax, leading to reflux. Certain asthma medications may also worsen reflux symptoms. Managing GERD will help to control asthma symptoms.

Rhinosinusitis. Studies suggest an association between asthma and chronic rhinosinusitis (CRS), the inflammation of the nasal mucous membrane and the sinuses. Asthmatics have a greater incidence of CRS, which further restricts airflow. CRS is therefore a significant and independent predictor of impaired lung function and quality of life.²⁹ Women suffering from both asthma and CRS have more intense asthma symptoms and are more likely to have an asthma attack, thus leading to women reporting lower quality of life scores. Evidence shows that the treatment of CRS leads to improved asthma symptoms and reduced use of asthma medications.

Obstructive Sleep Apnoea (OSA). There is evidence supporting an association of pathophysiology, symptoms, and therapies between OSA and asthma.³⁰ OSA refers to the partial or complete obstruction of the airway during sleep, commonly paired with snoring. Asthma is associated with an increased risk of new-onset OSA, in which asthmatics wake up with difficulty breathing. Asthma and OSA have been termed “alternative overlap syndrome” as their features are similar. Treatment of OSA results in a decrease in asthma-related symptoms.

Asthma and Osteoporosis

Data suggests that asthmatics suffer from higher rates of osteoporosis, particularly in the spine.^{31,32} Osteoporosis is a medical condition in which bone density is reduced, causing bones to become brittle and susceptible to fracture. Over time, the continued use of steroid tablets or high doses of inhaled steroids used to control asthma may diminish the body’s ability to absorb calcium and thereby increase the risk of osteoporosis. Generally, women are more susceptible to osteoporosis. It is therefore crucial that asthmatic women take extra precautions regarding their bone health.

Managing Asthma

Asthma, Health and Nutrition

The global obesity epidemic is one of today’s most publicized health problems. It was estimated that 51.6% of the EU’s population (18 years and over) were overweight in 2014.³³ Overweight and obese persons have greater incidence of health problems and are at increased risk of developing chronic diseases. The correlation between obesity and asthma is now widely recognized, with studies showing a greater association of obesity with asthma among women, compared to men.³⁴ Overweight and obesity are also associated with more severe asthma symptoms in women when compared to men. It is therefore important for women to take additional precautions to maintain a healthy weight.³⁵

While there is no conclusive evidence identifying specific foods and/or diets that cause or exacerbate asthma, experts believe that a well-balanced diet is an important component of maintaining overall health. There is some evidence suggesting that diets aimed at preventing cardiovascular disease and cancer may also reduce the risk of developing asthma.³⁶

Further research must be conducted so that we can understand the relationship between asthma and diet.

Asthma and Exercise

Studies show that regular physical activity minimizes asthmatic symptoms. Physical exercise strengthens the lungs, boosts the immune system, and supports weight loss; all of which contribute to reduced incidence of asthma attacks.³⁷ Currently, there is no data to suggest that one specific form of exercise is more suitable than any other but cardiovascular workouts in general are encouraged.³⁸

However, between 70% and 90% of people with asthma have exercise-induced asthma, which means that their symptoms are triggered by physical activity.³⁹ Inhaling colder and drier air during exercise induces the narrowing of airways. Symptoms include shortness of breath, coughing, wheezing, tightening of the chest, and fatigue. Women with well-controlled exercise-induced asthma should have no serious issues with their exercise regime. Women with asthma who do not fall into that category should visit their doctor to develop an appropriate exercise plan.

Steps for Policy Action

1. Improve existing EU data collection on asthma.

Currently, little data collection occurs at the EU-level examining asthma prevalence, incidence, morbidity, and mortality across the 28 Member States in comparison to other chronic diseases in Europe. Data should be collected annually at the national and EU-levels on the various indicators of asthma, disaggregated by sex/gender, age, and other dimensions. Regular and extensive data collection will inform government officials, policymakers, health officials, and patient organisations and can be used to combat the rising asthma burden across the EU.

2. Examine the effect of social determinants of asthma development and progression.

Asthma disproportionately affects adult women. Women who share an unequal burden of household work in comparison to men, especially professional household cleaners, are at a heightened risk of developing the disease. In order to tackle health inequalities, policymakers and healthcare professionals must understand the effect of social determinants on asthma and support health literacy programmes, targeted specifically at women.

3. Explore the impact of other risk factors and triggers on asthma development and severity.

Various other risk factors, some preventable, some not, increase women's susceptibility to asthma. Efforts should be made to better understand these factors, such as smoking, age, and sex hormones.

4. Examine the impact of asthma treatment on women's health.

Studies have demonstrated that asthma and asthma treatment impact an individual's risk of developing osteoporosis. Older women are thus particularly at risk. Efforts should be made to raise awareness among women and healthcare professionals of this interconnection to encourage early prevention of osteoporosis.

5. Increase accessible health information on asthma prevention and treatment.

Ensure that high-quality, accessible, and accurate information is available to EU citizens in order to educate them about asthma risks, prevention, and treatment.

6. Encourage more research to improve our knowledge of the complexity of asthma.

Examine how environmental and genetic risk factors interact with one another and the immune system in order to improve asthma prevention, diagnosis, and treatment. Study the influence of female hormones and HRT on asthma in women.

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