Asthma Triggers

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Learning objectives:

- Recognize the impact of patients' social history and life circumstances on disease presentation and management
- Explain the interactions between different disease conditions (asthma, anxiety and obesity) and how they can exacerbate one another
- Identify factors impacting the variables assessed in standardized measures of disease severity and why a patient might receive a high score when the score is not correlating with clinical suspicion of disease severity
- Describe the structural and social determinants of health in asthma and tailor interventions to a patient's preference, resources and life circumstances

Case synopsis:

Mr. A is a 32-year-old man with anxiety, allergic rhinitis, and poorly controlled asthma. He currently does not have health insurance and presents to a free clinic for routine care and medication refills.

Mr. A was diagnosed with asthma at 4 years of age and had severe disease requiring at least one hospitalization per year until his late teens. Due to lack of health insurance, he has sporadic treatment of his asthma as an adult. For many years he would go to the emergency room for inhaler refills and treatment of exacerbations. He currently uses high dose combination of steroid and long-acting bronchodilator inhaler (ICS/LABA) once daily and albuterol rescue inhaler. He uses 10 puffs of albuterol per day stating that he uses it when symptomatic, as soon as he wakes up, and oftentimes prophylactically when entering new places or buildings. He usually does not have audible wheezing. His asthma triggers include exercise, upper respiratory infections, and seasonal allergens. He works at a restaurant and smoke in the kitchen also triggers his asthma symptoms. Today his Asthma Control Questionnaire score is 2, which correlates with poorly controlled disease. He has no signs of increased work of breathing and lungs are clear to auscultation.

Mr. A also has anxiety which was first diagnosed as a child. The main trigger for his anxiety today is an ongoing custody case with his ex-wife. He has had to spend thousands of dollars on legal expenses. He is stressed about the outcome and worried about his children who are living with their mother. Work is also a significant source of stress for Mr. A. He is a manager at a busy restaurant and works evenings and weekends. His work schedule currently conflicts with the times he is allowed to call his children. He worries about how he is perceived at work as the restaurant is upscale and the customers are wealthy. He denies panic attacks but sometimes feels clammy and heart racing when he goes to new places or social settings. He has been driving for Uber for extra income as well. He sleeps about 5 to 6 hours a night. He tried fluoxetine as a teenager and again a few months ago. He stopped taking it as he did not think it worked and did not like how it made him feel. He uses medical marijuana (oral and tinctures) daily which he believes helps his anxiety. He has never been to talk therapy but is interested in trying it. He feels like he has adequate social support from co-workers, friends and his girlfriend. He denies suicidal and homicidal ideation.

Other medical history:

- Allergic rhinitis. He is symptomatic in the spring and summer and symptoms are partially controlled by cetirizine. Triggers include pollen and cut grass.

- Obesity: BMI is 35. He would like to lose weight. Mr. A's diet consists of meals from the Italian restaurant he works at; he usually eats pizza, pasta, bread etc. He has a gym membership but has not been in months due to his busy work and life schedule.
- Obstructive sleep apnea s/p uvulopalatopharyngoplasty and weight loss. He is no longer symptomatic.
- No spirometry test result on file

Other social history:
Mr. A lives by himself in a suburb outside the city. He is a former smoker (0.5-1 ppd) and quit 4 years ago. He has 5-6 alcoholic drinks with friends on the weekend. He denies illicit drug use. He is currently sexually active with his girlfriend and does not use protection.

Over the past decade, Mr. A has had sporadic health insurance coverage due to changing jobs frequently. He has had difficulty affording medications in the past and on occasion has delayed seeking care due to the associated cost. His current employer does not offer health insurance as a benefit and he is above the income cut-off to qualify for Medicaid. Due to his expenses, especially his ongoing custody battle, he is unable to afford private health insurance at this time.

1. **Construct a problem list for this patient**
2. **Conduct a root-cause analysis for at least one problem**
3. **Describe positive/protective social determinants of health for this patient**
4. **Describe negative social determinants of health factors**
5. **Propose patient-level solution with attention to facilitators and barriers**
6. **Imagine possible health system or institutional solutions**
7. **Discuss potential community/societal-level solutions**

Facilitator's Guide

Construct a problem list for this patient

a. Asthma
b. Anxiety
c. Obesity
d. Lack of health insurance

Conduct a root-cause analysis for at least one problem

For Mr. A's asthma (moderate, persistent) there are potentially 4 contributing factors leading to poor control:

- Allergen triggers <-- inability to control environment, lacking/not able to afford appropriate medications, lacking access to PCP and specialty care
- Lack of PCP and specialty care <-- no health insurance, busy work schedule, not able to take time off work
- Anxiety <-- worries about personal finance, legal custody battle, long work hours, managing his own asthma exacerbation
- High stress level <-- legal custody battle, work environment, personal finance, dealing with asthma exacerbation

Asthma is influenced by biologic, social and environmental exposures throughout the life course. In Mr. A's case, there is significant overlap between anxiety and asthma symptoms. It appears that he uses his rescue inhaler appropriately at times but also in response to perceived shortness of breath related to anxiety or panic attacks and prophylactically before encountering social situations that might exacerbate his anxiety. While Mr. A consistently scores "poorly controlled" according to the Asthma Control Questionnaire and high rate of rescue inhaler use, this did not match his clinical presentation (clear lungs on exam, has not required steroids in 4 years and last hospitalization for asthma was over a decade ago). This poses a challenge in identifying the root cause of Mr. A's symptoms and prescribing an appropriate medication regimen.

Describe positive/protective social determinants of health for this patient

- Employed: Mr. A has a stable income and could afford the costs of food, housing, phone & internet bills, and transportation.
- Transportation: Mr. A has his own vehicle which allows him to have reliable access to his place of employment and community assets (ex. grocery store, pharmacy, clinics, ER, gym, etc.).
- Social support: Mr. A is able to talk about his concerns and life stressors with multiple individuals in his life including his co-workers, friends and girlfriend.

Describe negative social determinants of health factors

- Financial instability: Mr. A works many hours a week in order to afford his necessities and to cover extra expenses. While this alone incurs psychological stress, it also impacts his health in other ways. For example, he tends to eat unhealthy food at the restaurant where he works to save time and money. He does not have time to engage in healthy habits such as exercise and stress relieving activities due to his demanding schedule. He is also unable to afford health insurance.
- Familial stress: Mr. A's ongoing custody case with his ex-wife is a significant source of stress in his life and exacerbates his underlying health issues. Individuals in low socioeconomic position

have greater exposure to constant and uncontrollable stress. Stress can be a major contributor to asthma and anxiety. These stressors evoke psychological appraisals of threat and activate the hypothalamic-pituitary-adrenal (HPA) axis, which initiates the "fight or flight" response via hormone release. While stress hormones are a valuable reaction to stressors in the short term, prolonged exposure to stress hormone promotes pathogenic processes such as increased inflammation and immune suppression, which increases an individual's risk of developing chronic illnesses and increase the severity of chronic illnesses such as asthma[1,2].

- Employment at restaurant: While Mr. A's regards his job as a restaurant manager to be particularly stressful, which contributes to his underlying anxiety. His work schedule is also not ideal as it prevents him from spending time with his children and requires him to work long shifts late into the night. He does not have adequate time to engage in healthy habits and leisure activities that alleviate stress. Additionally, smoke exposure at the restaurant exacerbates his asthma.
- Lack of health insurance and access to PCP and specialty care: Due to Mr. A's lack of stable health insurance he has delayed seeking care for symptoms due to the associated cost. In the past, he utilized the ER as his main source of health care. He has had multiple different providers in various settings rather than one provider who coordinates his care. As a result, he has been lost to follow-up on multiple occasions and has had to wait for months for appointments, especially to see a pulmonary specialist for his asthma. Access to mental health care is difficult for insured patient let alone for uninsured patients. Due to a national shortage of psychiatrists, it can take months to secure an appointment with a mental health provider. Additionally, many uninsured patients are unable to access talk therapy due to cost.

*<u>Discussion question</u>: Are there any other social factors not discussed that might contribute to his asthma control? Possible answers: housing condition, neighborhood pollution, green space, racism, childhood adversity, violence in community. Although not considered as a social factor, there is increasing evidence of the effects of **obesity** on asthma diagnosis and control. A review of past research by Mohanan and colleagues suggests an association between obesity and asthma with chronic inflammation secondary to obesity playing a role in asthma pathogenesis. They describe obesity asthma phenotypes, one being an atopic phenotype where early onset asthma is complicated by the development of obesity in adulthood[3].*

Propose patient-level solution with attention to facilitators and barriers

- Anxiety and stress management
    - Offer other SSRI medications (and not fluoxetine since he tried that already) for anxiety
    - Inquire about no-cost counseling services or psychological therapy affiliated with colleges and universities. There might be behavioral providers affiliated with free clinics or federally qualified health center near his home/work. Cognitive behavior therapy (CBT) has been shown to help with anxiety.
    - Encourage simple low-cost stress relieving interventions to improve anxiety (ex. deep breathing, mindfulness instruction on Youtube, relaxation apps for his phone).
    - Provide patient information on crisis mental health services in the area.
- Asthma
    - Encourage Mr. A to only use his albuterol inhaler when symptomatic. Show him breathing techniques and other stress relieving strategies before using the inhaler. Breathing retraining involves exercises that change the speed and regularity of

breathing patterns which can improve asthma symptoms and reduce bronchodilator use.
    - Provide a peak flow meter to monitor asthma symptoms and to guide appropriate use of rescue inhalers. Refer him to pulmonary function test if available/affordable.
    - As Mr. A was already on high dose (ICS/LABA) and albuterol inhalers, we can consider step-up treatment such as adding a leukotriene antagonist for better control.
    - Referral to pulmonologist for further management.
- Obesity
    - Gauge Mr. A's readiness to engage in behavioral modifications for weight loss.
    - Provide patient centered strategies to improve diet (ex. eating salads at the restaurant instead of pasta and pizza) and set realistic goals (ex. 1 lb per week).
    - Exercise can also improve asthma symptoms.
- Health insurance
    - Even though he could not afford insurance on the marketplace previously, it is still helpful to refer him to an insurance navigator as premiums and criteria do change from year to year.
    - Refer him to federally qualified health centers (FQHCs) and community health centers that offer free or sliding fee discount program for uninsured patients. Help him pick one that has late and/or weekend hours near work or home. FQHCs have the 340B Drug Program which provides an extensive formulary at very low cost. Student-run or free clinics cannot always provide all the needed resources to care for patients with chronic conditions.

Possible health system/institutional solutions

- Hospitals or health systems could offer access to testing and specialty services at discount or no charges for uninsured patients. Mr. A was seen at a student-run clinic affiliated with an academic health center. Patients are seen once a month by the same team of medical students supervised by faculty attendings which allow more continuity and coordination of care.
- As mentioned above, in addition to crisis intervention, health systems should provide low-cost/free counseling or talk therapy
- Some health systems (in Louisville and Los Angeles for example) provide asthma patients with Bluetooth-enable smart sensor that attaches to asthma inhalers. These devices track usage and location when inhalers are activated and feed data to physician practice to facilitate health education and adherence monitoring. These data also enable municipal and community organizations to reduce pollution in areas of high asthma activity[4].
- Some centers for excellence in asthma care or comprehensive asthma programs also employ community health workers to provide psychosocial support, ongoing education and environmental modification.

Possible community level/society-level solutions (including advocacy)

- Partner with community organizations to raise awareness about asthma triggers. Work with municipalities to change housing code and decrease pollution by enforcing environmental regulation, planting trees, developing recreational areas and green spaces.

- Clinics and hospitals can work with school nurses to allow the nurses to access asthmatic children's medical record to communicate with each child's healthcare provider(s).
- Advocate for universal access to health insurance such as Medicare for All
- Advocate for living wages such as $15/hr. minimum wage

Case follow-up:

Mr. A continues to follow up monthly with a student-run clinic that has pulmonary consultation. Adding a leukotriene antagonist to his medication regimen improves his overall symptoms, however, he continues to use his albuterol inhaler every day. He was referred to a psychiatrist who prescribed medication, however Mr. A did not want to pursue medication management of his anxiety due to his previous experience with fluoxetine. He continues to use marijuana for his anxiety. He is able to pursue subsidized talk therapy. He changed jobs and now manages a dumpster rental company. This job pays more than his previous job and has better hours (9am-5pm, M-F). He is hoping that he can get health insurance from his new employer after a 90-day period. His custody case is almost resolved. His anxiety significantly improves with these changes to his life.

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