Spotlight on House Dust Mite Allergy

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I am the tertiary lead CNS for paediatric asthma at Barts Health, working from the Royal London Hospital. I have experience in working with asthma from primary through to tertiary care, and have established several childrens' asthma services in various settings. My background is in urgent and emergency paediatrics, which drives my passion for self-management and accessible, inclusive resources for families. In the new year, I will be taking on the role of Senior Specialist CYP Asthma Practitioner for North-East London.

House Dust Mite [HDM] is one of the most common triggers for children and young people [CYP] with allergic asthma. They are considered a major indoor aeroallergen all over the world that precipitate allergic reactions including rhinoconjunctivitis, food allergy, atopic dermatitis, and allergic asthma (Okasha 2021). Interestingly, it is not the creature itself, but the droppings that cause the allergy, which continues even after the mite has died. We still have a lot to learn about HDM and its place in allergic disease, as well as its impact on the allergic proteins within the body –and therefore how it causes such issues for a tiny creature (Fan Xu 2021)

What is it?

House Dust Mite is a tiny creature measuring around 0.25mm and therefore invisible to the naked eye. They thrive in warm, humid environments rich in human skin scales, as they eat these once they have been partially digested by moulds. They are normal in the human habitat, as we like homes which are warm and comfortable – and aren't a problem for everyone. We can never completely eradicate house dust mite, but we can minimise their numbers and impact for those sensitive to them.

HDM is one of the major perennial allergens for both allergic rhinitis and allergic asthma (Calderon 2015), and one of the most common triggers in the home environment. It can also be one of the most common eczema triggers (Allergy UK 2022). It is particularly problematic because it is often present in homes despite normal cleaning measures, and invisible to the naked eye. They are found everywhere, but particularly in rooms with more soft furnishings such as bedding and upholstery. For this reason they are usually more problematic in the bedroom - causing nocturnal symptoms.

Children will generally present with perennial symptoms (i.e. all year round) which tend to appear at night, or first thing in the morning. They might tell you they cough, and that it wakes them up - or they might say that they cough when they go to bed or first thing in the morning. What is important, is to take a thorough clinical history including family and personal history of atopy, other concurrent conditions and whether the reactions or symptoms are situational or always present. We often find ourselves as specialist clinicians re-taking the histories to understand whether symptoms are seasonal, situational or perennial.

Research has shown that levels of HDM allergens and their nitrated products were generally higher in the winter, at low altitude and in dwellings with higher numbers of females (Fan Xu *et al* 2021).

What to look out for:
Coughing when they are in environments rich in HDM (e.g. bedroom, living room, rooms with soft furnishings). Children with HDM allergy and allergic asthma will typically cough at night time, and first thing in the morning. If they have rhinitis too, they may also cough when they first lay down at night. They might have a runny or blocked nose - and may find that the cough improves with antihistamines and nasal sprays.

Whilst wheeze is a well-known asthma symptom (which may well be triggered by environmental pollutants or irritants), according to Okasha et al (2021) more HDM-sensitised CYP will present with cough than wheeze - and the presenting symptom could, according to their study, be a dividing factor. They found a statistically significant difference between HDM sensitised and non-sensitised people – in that those sensitised were mostly associated with cough and allergic rhinitis, and that HDM sensitisation increased disease severity (therefore worsening control).

Impact on daily living
We know that people with atopy are more likely to be affected by HDM (Huang *et al* 2020). It is estimated that 30% of people with atopy (those with one or more allergic conditions such as asthma, eczema, allergic rhinitis or hayfever, and allergies themselves) have had to change their lifestyle to help reduce their risk of reaction. This might include different cleaning products, regimes, or even having to purchase items like a new vacuum cleaner or bedding (Baldacci *et al.* 2015). This alone tells us that almost a third of the allergic population have to make daily changes or financial commitments to manage their allergy. In the context of the cost of living crisis and when we consider the cost of some of these interventions and the availability of suitable housing in some geographical areas, it perhaps is not surprising that some people are more affected than others.

HDM allergy can be really troublesome for many people with allergic asthma. It can be particularly difficult at night, when many people with allergic asthma might cough or feel tightness when their asthma isn't well controlled. We know that people with allergic rhinitis (sometimes called hay fever) tend to have more symptoms when they first lay down, due to post-nasal drip when mucus drips down the back of the throat, causing cough. The 'one airway' model is something clinicians working with people who have asthma and allergies often explain, being the concept that the nose and lungs are joined together as one airway, so inflammation and irritation in one area will trigger all of the airway (PCRS 2022).

Sleep is important for everyone, but it is especially important for children and young people. It is when we heal, grow and process the events of the day- and is vital for physical and emotional health and development (Healthier Together 2022). Good sleep hygiene can be effective to a point, but if symptoms are pointing towards allergy or asthma getting out of control, specific measures can help.

A study carried out by Gomez et al (2022) found that school attendance and performance was significantly affected for those with allergic asthma, who also had HDM as a trigger. They also found that school attendance increased following a treatment called Allergen Immunotherapy. You can read more about the treatments for HDM allergy on the Allergy UK website.

Trigger avoidance
HDM reduction measures will lower the numbers of HDM in the home but not completely remove them. Cleaning and following the HDM reduction measures may lower the levels enough to minimise allergy symptoms, but will not eradicate fully. What is evident is that the measures should be taken together – changing bedding alone, for example, is not sufficient. Bedding should be washed at 60 degrees, and if this is not possible should be dry cleaned. It is suggested that pillows could be deep frozen for eight hours at a time, each month. Padded headboards should be avoided, as the mites will reside in them and they are difficult to clean.

For children with bunk beds, it is suggested that the child with the allergy should take the top bunk to avoid dust falling from the top bunk's mattress. Soft toys should be avoided or minimised – precious soft toys or soft furnishings should be washed or frozen monthly. There is no need to deprive children of their favourite toy or "lovey".

If possible, it is suggested that the HDM allergic person does not change the bedding or HDM reduction measures, and does not return into the bedroom until 30 minutes after the bed has been changed. It has been recommended that damp dusting and vacuuming is done at least once per week, avoiding heavy curtains and soft flooring if possible.

Vacuum cleaners with a HEPA filter, and that do not blow out dust, are recommended. This is because they trap the HDM more effectively but also minimise aerosolisation of the HDM itself to the cleaner.

How can we differentiate between asthma and rhinitis? Cough can be key here: I often find myself asking my patients (and their grown-ups) when they cough. If it is in the middle of the night, it is likely to be asthma. If it is when they first lie down it is probably post-nasal drip, an indication of allergic rhinitis.

Treating allergic rhinitis

There are medicines that can help children and young people who are sensitive to HDM, and have allergic asthma or rhinitis. These include nasal sprays (usually containing a steroid) and antihistamines like Cetirizine.

When clinicians choose the treatment, they will carefully consider the child's age and development before deciding on a course of action. Nasal sprays are considered the first-line treatment for those with allergic rhinitis, but are not always practical or effectively administered in young children. Antihistamines can be sedating or non-sedating (meaning they may, or should not - make you sleepy). This is a key message when we consider medications for allergy - whilst historically there was little choice, we now have a good selection of first generation antihistamines which do not have such a high profile in terms of side-effects. This is important when we consider that the child or young person might already be tired at school or nursery because they have been awake in the night whilst the issue is poorly controlled. We might improve attendance to school, but the CYP need to be able to concentrate and engage in the lessons.

One of the most common problems clinicians find in practice, that can have a significant impact on the CYP's symptom control, is device technique. If the person cannot use their inhaler or nasal spray in the best way, the medicine simply doesn't reach the inflamed parts of the airway. Another key learning point here is the fundamental role of pharmacy in the patients' self-management journey – they are so often the only clinicians that see the CYP and their devices at the same time. In this manner, pharmacy teams are well-placed to coach and teach inhaler and device technique as well as counsel on oral medication. We advocate using metered-dose inhaler (pMDI) with a spacer to help the medication reach the smaller airways, and for nasal sprays to be tilted towards the ear on each side to ensure good medicine deposition (Asthma UK, 2022). There are some fantastic instructional videos around this on the Asthma UK website including most inhaler and nasal spray devices.

The most common pharmacological measures to help minimise HDM sensitised allergic asthma and rhinitis are nasal sprays and antihistamines.

Some patients say all the measures feel like a checklist, and no one intervention will minimise HDM on its own.

In summary...

House Dust Mites are tiny creatures that are found in all homes. For many people, they do not cause any problems - but for those sensitised to HDM, and especially those with allergic-driven asthma with cough as their main symptom - HDM allergy can significantly impact the severity and manageability of allergic asthma.

- No one measure will eradicate HDM – it takes different measures to minimise HDM in your home.
- Careful cleaning will help to minimise the impact of HDM on vulnerable CYP, but this must be carried out carefully, with consideration to who is cleaning and the equipment used.
- Measures such as bedding and floor changes can be effective, but only along with other measures and with consideration to the replacement, in the context of effective treatment of asthma and allergic rhinitis.
- Device technique is vital when considering asthma and allergic rhinitis control, and community pharmacy is key to optimising this!

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