Mite-proof bedcovers: are they helpful?

Dr. Alson W.M. CHAN

MBChB, DCH (Ireland), Dip Ger Med RCPS (Glasg), PdipCommunityGeriatrics (HK), MRCPCH, FHKCPaed, FHKAM(Paed)
Specialist in Paediatric Immunology & Infectious Diseases
Allergy Centre, Hong Kong Sanatorium & Hospital

Do dust mite-proof bedcovers really work? House dust mite is the commonest indoor allergen found in Hong Kong and Southeast Asia.[1] It has been the main risk factor for wheezing in children from Guangzhou, and is closely related to asthma, the commonest chronic disease in childhood.[2] Respiratory infections and house dust mite allergy act synergistically to markedly increase the risk of asthmatic exacerbation and hospital admission.[3]

Measures to minimize dust mite exposure have been widely adopted by many patients in our locality, although evidence of their efficacy is not convincing. Major meta-analysis has failed to show any definitive clinical benefit from measures to reduce dust mite exposure.[4,5] However, a recently published randomized double-blind placebo-controlled trial which studied the effect of mite-proof bedcovers on the risk of severe asthmatic exacerbations and emergency department (ED) attendance may change our current understanding of the role of dust mite-impermeable bedcovers in asthma control. The results significantly add to the body of evidence on the efficacy of measures to minimize dust mite exposure.[6]

A cohort of 284 children in the U.K. aged 3-17 years with physician-diagnosed asthma were recruited after an episode of asthmatic exacerbation requiring emergency attendance. They were skin prick-tested to confirm their sensitization to house dust mite, and were then randomized into two groups using, over the following 12-month period, either dust mite-proof bedcovers or conventional bedcovers with matched design and texture, the latter serving as placebo. The dust mite concentrations in the cohort's mattress (ng/m^2) at recruitment and after the study period were also measured.

The primary outcome was that significantly fewer children in the active group (using dust mite-proof bedcovers) attended the hospital ED because of asthmatic exacerbations (29.3% vs 41.5%, OR 0.58, CI 0.34-0.99, P=0.047) using intention-to-treat analysis. The risk of emergency hospital admission was 45% lower in the active group (Hazard Ratio 0.55, CI 0.36-0.85, P=0.006). The secondary outcome was the significantly improved quality of life during the study period in the active group using PACOLO (quality of life questionnaire), and up to 90% of the children in the active group expressed their wish to continue to use those bedcovers to relieve their asthmatic symptoms even after the study period. The dust mite level from the children's mattresses was reduced by 84% in the active group with no significant change in the placebo group.

This is the first prospectively conducted randomized double-blind placebo-controlled trial studying the impact of the avoidance of dust mite exposure using mite-proof bed encasings on clinical exacerbation, ED attendance and hospital admission related to asthmatic attacks. In general, asthmatic exacerbation-related ED visits and hospital admissions are mainly contributed by those patients at higher risk of life-threatening asthmatic attacks and unstable disease control, and are associated with higher health care cost. This clinical trial affirmed the role of mite proof-bedcovers in reducing asthmatic exacerbations, ED attendance and hospital admissions, and in improving their quality of life. The avoidance of dust mite allergen may serve as a simple and potentially most cost-effective intervention for all asthma patients of any severity, while sparing them of the side effects associated with pharmacological treatments.

Although the study results were encouraging in this cohort of U.K. children and adolescents, there is still not enough information to extrapolate such clinical efficacy to the adult patients, nor to the use of mite-proof bedcovers from other non-studied brands, nor to other allergic diseases such as allergic rhinitis, allergic conjunctivitis and atopic dermatitis. Earlier randomized studies of using various environmental measures to reduce dust mite exposure in adults have failed to show any significant difference in control or reduction of allergic symptoms nor in airways inflammatory markers. It is important to note that in some of these negative studies, the ineffective measures have failed to reduce the actual mite density in the environment.

In conclusion, further similarly well-designed studies are called for to answer these questions before a general recommendation on mite-proof bedcovers could be made. Meanwhile, our asthma patients should be well informed of the potential clinical benefit of mite-proof bedcovers, and their consideration for the use of such bedcovers should involve balancing the potential clinical benefit and the additional cost of these bedcovers.

References

1. Zhang C, Li J, Lai X, Zheng Y, Gjesing B, Spangfort MD, et al. House dust mite and storage mite IgE reactivity in allergic patients from Guangzhou, China. Asian Pac J Allergy Immunol.2012;30:294-300
2. J. Li, H. Wang, Y. Chen, J. Zheng, G. W. K. Wong, N. Zhong. House dust mite sensitization is the main risk factor for the increase in prevalence of wheeze in 13- to 14-year-old schoolchildren in Guangzhou city, China. Clinical & Experimental Allergy, 2013 (43) 1171–1179
3. Murray CS, Poletti G, Kebadze T, Morris J, Woodcock A, Johnston SL, Custovic A. Study of modifiable risk factors for asthma exacerbations: virus infection and allergen exposure increase the risk of asthma hospital admissions in children. Thorax. 2006 May;61(5):376-82
4. Gøtzsche PC, Johansen HK. House dust mite control measures for asthma. Cochrane Database of Systematic Reviews 2008, Issue 2
5. De Blay F, Barnig C, Ott M. House dust mite control measures for asthma. Allergy. 2009 Jan;64(1):189
6. Murray CS, Foden P, Sumner H, Shepley E, Custovic A, Simpson A. Preventing Severe Asthma Exacerbations in Children. A Randomized Trial of Mite-Impermeable Bedcovers. Am J Respir Crit Care Med. 2017 Jul 15;196(2):150-158