

EDITORIAL

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Disturbed sleep: symptom or cause of allergic disease?

This editorial discusses the findings of the paper in this issue by S. Jernelöv et al. [11] pp. 552–559.

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There is increasing evidence that allergic diseases such as allergic rhinitis (AR), asthma, and atopic eczema (AE) are associated with nocturnal symptoms causing sleep problems [1–4]. The impact on sleep increases with disease severity and adequate control of symptoms including nocturnal symptoms is important. Thus, a thorough diagnostic work-up should optimally include information on sleep disturbances. Children represent a particular challenge, since they do not necessarily present their problems as clearly as adults. As for AR, tiredness and decreased work or school performance are often reported as major complaints and causes of decreased quality of life. Tiredness may be due to a combination of immunological alterations, for example, allergen-induced release of inflammatory mediators, and sleep deprivation. Nasal congestion during night-time and nocturnal asthma symptoms may contribute to sleep disturbances and decreased quality of sleep. Importantly, both asthma and AR are associated with increased risk of sleep disorders such as sleep-disordered breathing, snoring and obstructive sleep apnoea (OSA). These co-morbidities should be considered in all asthmatics. Obesity, a world-wide increasing problem, is linked to both asthma and sleep disorders, and their mutual interactions need further investigation [5, 6]. Treating the obese state may for some asthma phenotypes be an inevitable part of future treatment strategies, since obesity-related phenotypes may be less responsive to traditional asthma treatments [7]. Sleep disruption due to itching and scratching during night-

time is also a significant problem for children, and their parents, suffering from severe AE.

There is limited published data on the possible beneficial effects of various treatments on sleep in allergic patients. However, cross-sectional studies have shown that severity of disease correlates with sleep impairment [8] pointing to optimization of treatment as a measure to improve quality of sleep. In line with this, treatment of AR with intranasal steroids improves nasal congestion and sleep; and decreases daytime fatigue [1]. Treatment with antihistamines may improve itching and nasal congestion during night-time, but on the downside older generations of these drugs may cause day time sleepiness. The beneficial effects of allergen-specific immunotherapy on QoL are also well-documented and these effects may also relate to sleep [9]. Future trials on the efficacy of treatments for allergic diseases should consider effects on sleep problems at least as secondary outcomes. There are available methods for this as some disease-specific quality of life (QoL) questionnaires contain items addressing sleep [4, 8].

While cross-sectional studies have clearly linked allergic diseases to different sleep problems, few epidemiological studies have made attempts to investigate the relationship between sleep problems and allergic diseases in a longitudinal design [10]. In this month's issue of *Clinical & Experimental Allergy*, Jernelöv et al. present data from a longitudinal study showing that children reporting to being overtired at the age of 8 years were 2.5-fold more likely to report rhinitis symptoms at the age of 13 years [11]. A similar relationship was not seen for symptoms of asthma and eczema. The longitudinal association between overtiredness and rhinitis symptoms appeared to be robust and remained after exclusion of children with rhinitis at baseline (8 years of age). On the basis of this finding, the authors speculate that overtiredness could be causally related to development of rhinitis. On the other hand, they also observed that the presence of asthma

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symptoms at the age of 8 years was a significant predictor of being overtired at age 13 years, a finding that underlines that the relationship between sleep problems and allergic diseases works in both directions. Since AR and asthma are often undiagnosed and tend to take a chronic intermittent course with periods with few, if any, symptoms, it may be difficult to determine the causal direction of these associations, even in a carefully performed longitudinal study like the one performed by Jernelöv *et al.* Nevertheless, their study raises important questions about the relationship between sleep and allergic diseases, a topic that has been somewhat neglected. More attempts to address the temporal relationship and causal direction between sleep problems and allergic diseases seem warranted.

Accurate assessment of sleep and its many different aspects is one of the challenges related to this research. Future epidemiological studies should consider options for collecting data on different aspects of sleep, since they may be differentially related to different health outcomes. Some available standardized quality of life questionnaires include some information on quality of sleep. Few studies have included objective measurements of sleep, but there are available measures for doing this, although they are considerably more time-consuming than questionnaires. Genetic determinants of sleep may also function as objective and unbiased markers of exposure to sleep impairment in epidemiological studies

of effects of sleep on different health outcomes. The genetics of sleep are under investigation and may provide important insights into the mechanisms by which sleep and allergic disease are interconnected [12]. Another challenge of epidemiological studies is to take into account possible confounding factors that may bias associations between sleep problems and allergic disease. As noted above, obesity is one such factor, but there are likely other important confounders as well.

In conclusion, patients with allergic diseases often have problems with sleep and fatigue. These consequences deserve increased attention among physicians, since they can be ameliorated by proper treatment. There are good reasons to take sleep more seriously. First of all, it has significant impact on QoL and day time functioning, but it may also influence the risk of other conditions such as metabolic [13] and mental diseases [14]. Hence, strategies for treatment of allergic diseases should also consider sleep problems. Several studies underline that allergic diseases are often undiagnosed and undertreated [15] in spite of the many efficient treatment options that are at hand. Indeed, suspicion of disease-related disturbance of sleep strengthens the indication for treatment.

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