

Brief Report

Wood Dust Sensitization Among Danish Woodworkers

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BACKGROUND

Existing studies indicate that workers exposed to wood dust stand an increased risk of suffering from asthma, a disease consistent with both an allergic and a non-allergic origin. For some wood types, the presence of sensitization measured by skin prick test (SPT) or specific IgE has been demonstrated [Chan-Yeung, 1999], as well as for pine [Skovsted et al., 2000]. The extent of IgE-mediated wood dust sensitization is not clear although it seems from the sparse epidemiological evidence, that only a number of woodworkers are sensitized [Cormier et al., 2000].

AIM

The aim of this study was to explore the association between wood dust exposure and sensitization to wood dust, and furthermore to explore the relationship between wood dust sensitization and asthma.

METHODS

In 1997–1999, a cross-sectional study of 54 furniture factories and 3 control factories from Viborg County Denmark was conducted to investigate the relation between wood dust and respiratory impairment [Schlünssen et al., 2002]. Among others, respiratory symptoms were documented by questionnaire among 2,033 woodworkers and 474 controls. Based on results from this questionnaire, random samples of persons reporting asthma symptoms, rhinitis symptoms, and no respiratory symptoms were invited to clinical examinations. A total of 365 woodworkers and 88 control persons accepted to participate. The clinical examinations included SPT and histamine release (HR) for pine and wood boards, and specific IgE for pine [Skovsted et al., 2003]. Bronchial histamine provocation test was performed using the method of Yan et al. [1983]. Personal passive dust measurements were taken on 289 woodworkers.

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TABLE I. Wood Dust Sensitization Among Woodworkers and Controls

	Exposed, total (N = 365)	Controls (N = 88)	OR (95% CI)
Pos. SPT pine, %	5.1	7.2	0.7 (0.3–2.0)
Pos. HR pine, %	5.7	11.5	0.5 (0.2–1.2)
Specific IgE pine, %	2.6	3.8	0.8 (0.2–3.2)
Pos. SPT boards, %	4.8	14.5	0.3 (0.1–0.8)
Pos. HR boards, %	18.5	33.3	0.4 (0.2–0.8)

SPT, skin prick test; HR, histamine release.

OR (odds ratio) adjusted for smoking, gender, and age in logistic regression models.

TABLE II. Sensitization to Pine and Boards in Relation to Asthma

	Pos. SPT pine (n = 24)	Pos. HR pine (n = 30)	Specific IgE pine (n = 14)	Pos. SPT boards (n = 29)	Pos. HE boards (n = 94)
Asthma symptoms and BHR (n = 54)	2.0 (0.5–7.7)	5.0 (1.4–17.5)	9.8 (1.1–89.5)	3.9 (1.1–14.6)	1.4 (0.7–3.0)
Asthma symptoms (n = 244)	1.7 (0.6–4.7)	2.6 (0.9–7.7)	6.1 (0.8–47.5)	2.9 (1.0–8.6)	1.1 (0.7–1.9)
Work-related asthma symptoms (n = 82)	1.4 (0.4–5.3)	4.3 (1.3–14.1)	8.6 (1.0–74.7)	1.3 (0.7–2.5)	1.1 (0.7–1.9)

SPT, skin prick test; HR, histamine release; BHR, bronchial hyper-responsiveness.
Unadjusted OR (95% CI).

RESULTS

The overall GM (GSD) inhalable wood dust concentration was 0.98 mg/m³ (1.89). As seen in Table I, the prevalence of wood dust sensitization was highest among the non-exposed controls, most pronounced for SPT for boards, and less pronounced for specific IgE for pine. Among woodworkers, we found the highest prevalence of pine sensitization among the highest exposed workers (7% vs. 0% for SPT, 8% vs. 2% for HR, and 4% vs. 0% for specific IgE).

As seen in Table II, the highest ORs were found for asthma in relation to specific IgE for pine, most pronounced among subjects with both asthma symptoms and bronchial hyper-responsiveness (BHR). Increased ORs for asthma were also found for positive HR for pine and SPT for boards. Unadjusted ORs are shown, as adjusting for smoking, gender, and age in logistic regression models only marginally changed the results.

DISCUSSION

The increased prevalence of wood dust sensitization among the control group could be due to a healthy worker effect. Also it is not unlikely, that some subjects are sensitized from other sources than work. Still our results indicate, that the level of exposure among woodworkers has an impact on the sensitization rate.

Asthma was associated to wood dust sensitization, but few subjects were sensitized. Only 14 subjects were identified with specific IgE to pine. This indicates, that only a minor part of respiratory complaints may be explained by sensitiza-

tion to wood dust, which supports earlier results [Åhman et al., 1995; Chan-Yeung, 1999].

CONCLUSION

Only a minor part of respiratory complaints among woodworkers may be explained by specific sensitization. However, the sensitization rate for pine was dose dependent, and asthma was associated to wood dust sensitization, especially for workers with specific IgE and positive HR for pine and SPT for boards.

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