Impact of Chlorinated Swimming Pool Attendance on the Respiratory Health of Adolescents

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OBJECTIVE The goal was to estimate the burden of allergic diseases associated with chlorinated pool exposure among adolescents.

METHODS We examined 847 students, 13 to 18 years of age, who had attended outdoor or indoor chlorinated pools at various rates. Of them, 114 had attended mainly a copper-silver pool and served as a reference group. We measured total and aeroallergen-specific immunoglobulin E (IgE) levels in serum and screened for exercise-induced bronchoconstriction. Outcomes were respiratory symptoms, hay fever, allergic rhinitis, and asthma that had been diagnosed at any time (ever asthma) or was being treated with medication and/or was associated with exercise-induced bronchoconstriction (current asthma).

RESULTS Among adolescents with atopy with serum IgE levels of >30 kIU/L or aeroallergen-specific IgE, the odds ratios (ORs) for asthma symptoms and for ever or current asthma increased with the lifetime number of hours spent in chlorinated pools, reaching values of 7.1 to 14.9 when chlorinated pool attendance exceeded 1000 hours. Adolescents with atopy with chlorinated pool attendance of >100 hours had greater risk of hay fever (OR: 3.3–6.6), and those with attendance of >1000 hours had greater risk of allergic rhinitis (OR: 2.2–3.5). Such associations were not found among adolescents without atopy or with copper-silver pool attendance. The population attributable risks for chlorinated pool-related ever-diagnosed asthma, hay fever, and allergic rhinitis were 63.4%, 62.1%, and 35.0%, respectively.

CONCLUSION Chlorinated pool exposure exerts an adjuvant effect on atopy that seems to contribute significantly to the burden of asthma and respiratory allergies among adolescents.

Key Words: chlorine • swimming pool • childhood asthma • atopy • aeroallergens • hay fever • rhinitis

Abbreviations: IgE, immunoglobulin E

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