Asthma & Swimming: What’s the Verdict?

Abstract:

Ireland has one of the highest prevalence rates of asthma in the world with 1 in 7 children and 1 in 10 adults affected. Its symptoms are characterised by either cough, feeling of chest tightness or wheezing which can be episodic or triggered by colds, sudden change in temperature, exercise or exposure to environmental allergens. Although some exercise can elicit its symptoms, swimming is considered a safe form of exercise based on the assumption that the humid environment is protective against exercise-induced bronchoconstriction. Unfortunately, conflicting reports emerging over the last two decades on the effects of swimming have created a cloud of confusion among parents and doctors. This article aims to provide health professionals with an up-to-date knowledge on this matter. Early studies reported that asthmatic children who participated in a 6-8 week swimming program had better aerobic capacity and asthma control. It is also noted that in children with mild persistent asthma, indoor swimming sessions (without chlorination) had a positive effect on lung function and bronchial hyper-reactivity (BHR) significantly decreased. Over the last decade however, several reports have reported the detrimental effect of prolonged chlorine exposure as well as the observation that children attending indoor chlorinated swimming pools has increased risk of developing asthma.

"Long term attendance at indoor chlorinated swimming pools in children up to the age of 7 years is a major factor in the rise of asthma in the developed countries......" Early study in a cohort of swimmers reported an increased incidence of exercise-induced asthma. It is suggested that volatile compounds from pool chlorination acted as possible irritant agents. Studies also reported an elevated level of neutrophils and eosinophils count along with increased bronchial hyper-responsiveness. This increased bronchial responsiveness however, became attenuated and disappeared after discontinuing their intensive training. One group of researchers has conducted several studies to assess the acute and chronic effects of indoor swimming. Serum levels of surfactant associated proteins A and B (markers of lung hyper-permeability and cell injury) were measured in a subset of healthy children (before & after a swimming session) as well as in 226 healthy children who have been attending an indoor swimming pool since the age of 6 years old. Serum concentrations were found significantly increased not only after a swimming session but also after 1 hour pool exposure prior to swimming. A positive dose-effect relationship was also seen between serum SP-A & SP-B and cumulated pool attendance (CPA) - Goodman et al conducted a meta-analysis on 25 relevant studies performed over the last four decades. From six epidemiological studies looking at the association between swimming and asthma in childhood, none of the individual point estimates demonstrated a significant increase in asthma prevalence among those participating in swimming activities. They found no consistent association between asthma prevalence and the use of swimming pool in childhood. Recently, the first prospective longitudinal study to examine whether swimming in infancy and childhood was associated with asthma and allergic symptoms was published. More than 5,700 British children were followed up to the age of 10 years. After adjusting the effect of confounders, swimming was found not to be associated with ever asthma; its frequency did not increase the risk of having asthma/ allergic symptoms and irrespective of their atopic status and the presence of a cumulative pool attendance (CPA) it had no effect on the risk of having asthma at 7 years of age. Surprisingly, in those with current asthma at 7 years of age, swimming was associated with higher FVC and FEV1, suggesting its protective effect. The significance of these results was recently debated. Proponents of regular swimming design has provided the natural experimental environment and validated epidemiological tools were used to correct most significant confounders. Their findings have somehow challenged the idea of pool chlorine hypothesis. On the other hand, Bernard and his colleagues believe that early exposures to chlorinated pools may have exerted an adjuvant effect in sensitisation process itself. This theory is supported by their own data and those from previous observational study which demonstrated a lower prevalence of asthma and respiratory allergies in subjects who swim in swimming pools disinfection by copper-silver ionisation method. They also suggested two possible explanations for the negative association in this study. First, due to the differences in exposure-response relationship and the natural course of respiratory diseases, the association between swimming and asthma are more difficult to be identified in younger children. Second, the researchers have underestimated the cumulated pool attendance (CPA) for their study population. They argued that since the climate and socioeconomic status in United Kingdom are not so different from Belgium, there is no reason to believe that the rates of swimming pool attendance are lower given its popularity among its society. Numerous studies have attempted to associate chlorine exposure and the risk of either developing asthma or worsening its the control. Due to differences in study population and methods, results have been conflicting. It is important to note that individuals exposed to chlorine and exercising regularly may be exposed to additional environmental pollutants and co-morbidities. Hence, parents should be aware of these inherited differences and should be regularly reminded on simple measures such as a warm-up period as well as pre-treatment with bronchodilators which often reduces the risk of exacerbations. Sports athletes on the other hand, need to be aware of the Therapeutic Use Exemption (TUE) policy, established by the Irish Sports Council that allow athletes with valid medical reasons to continue to use medications that are often prohibited in sports. Finally, a good advice to parents is that they should be encouraged to be pro-active to ensure that swimming pool facilities provided in school and in the community are safe, well ventilated, clean and not overly crowded. All of which if not monitored could lead to deterioration of their child’s health.

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References
1. Asthma Society Ireland. Take Control of Your Asthma!
4. Fitch KG, Morton AR, Blanksby BA. Effects of swimming training on children with asthma. Archives of Disease in Childhood 1976;51:190

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