

LETTER TO THE EDITOR

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LETTER

Effect of Swimming on Peak Expiratory Flow Rate of Atopic Children

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ABSTRACT

This study was conducted to evaluate the role of swimming on mechanic of lung in healthy individual and patients with asthma. A total 76 girls who took part in the course of regular swimming session three day per week for eight weeks enrolled in this study. All of them completed ISAAC written questionnaire and individual who was suspected of asthma or other atopic diseases was referred to allergist for more evaluation. Peak expiratory flow rate was recorded for participants at beginning, one hour after swimming and two months later. According to ISAAC questionnaire 35.4% had asthma or other atopic diseases. Increase in PEFr more than 20% of personal best was seen in 21.9% after one hour swimming and in 27.6% after two months. Increase in PEFr was significant in healthy individual and asthmatic patients and obese but was not significant in patients with allergic rhinitis or eczema. This study suggests swimming in indoor pool is useful for patients with asthma in spite of potential toxic role of chlorine in exacerbation of asthma symptoms and lung mechanics.

Key words: Asthma; Peak flowmetry; Swimming

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Exercise-induced bronchoconstriction (EIB) describes acute, transient airway narrowing that occurs during and most often after exercise.¹ Fifty to ninety percent of all individuals with asthma have airways that are hyperreactive upon exercise.² Chlorine releasing agents (calcium or sodium hypochlorite and chlorinated isocyanuric acids) are frequently used for the disinfection of water in swimming pools. The free chlorine reacts with pollutants introduced by humans, such as sweat and urine,³ to form aldehydes, halogenated hydrocarbons, and chloramines. These compounds could be harmful for airways that occasionally exacerbate asthma symptoms. On the other hand, long-term physical exercise program could improve cardio respiratory functions in asthmatic children.⁴ Swimming has been shown to be less asthmogenic than other forms of exercise. Some studies have also shown improvement in asthma symptoms in children participating in exercise programs.⁵ To determine effect of swimming in atopic children, our study was designed to compare the effect of regular swimming session in healthy with asthmatic patients. 96 girls who took part in swimming class enrolled in this study. Standard ISAAC questionnaire was completed for all participants. 76 out of 96 girls took part in swimming training class 3 days per week for two months and they had peak flowmetry at beginning, one hour after swimming and the last peak flowmetry at two months later. Each swimmer had at least 3 attempts with correct technique and then the best measures recorded. In addition, patients who were unable to use peak flowmeters correctly despite instruction were excluded. All girls were divided into asthmatic patients, allergic rhinitis, atopic dermatitis or healthy according to ISAAC questionnaire. All atopic patients were referred to allergist for more evaluation and spirometry. Peak expiratory flow rate (PEFR) variation calculated before and after swimming in healthy persons, asthmatic patients and other atopic patients and analyzed in SPSS.

The youngest swimmer was 5 years old and the oldest one, 17 years old (Mean: 9.3+/-2.4). According to ISAAC questionnaire 34 girls (35.4%) had one of the criteria related to asthma or other atopic diseases that all of them were referred to allergist for more evaluation but only 9 girls came to allergy clinic. Increase in PEFr more than 20% of personal best was seen in 21 girls (21.9%) after one hour swimming (Table 1). Increase in PEFr more than 20% was seen in 21 swimmers (27.6%) after 2

Table 1. Changes of peak expiratory flow rate in swimmers.

Change of swimmers PEFR	After one hour swimming		after 2 months swimming	
	Number	Percent	Number	Percent
PEFR Changes				
Decrease in PEFR>20%	3	3.12	2	2.6
Increase in PEFR<20%	57	59.37	46	60.5
Increase in PEFR>20%	21	21.87	21	27.6
No change in PEFR	15	15.62	7	9.2
Total	96	100	76	100

months of taking part in swimming sessions (Table 1). Increase in mean PEFR from 266+/-36.44 to 270+/-30.82 was seen in swimmers with allergic rhinitis after 2 months (P=0.74). Changes in mean PEFR in atopic patients with skin manifestation was 293+/-75.13 at start that decreased to 289+/-70.93 after two months (P= 0.74). Obesity was seen in 6.25% of swimmer and mean PEFR in obese girls was 243.75+/-58.78 at the start that increased to 283.75+/-58.29 after 2 months. (P= 0.000)

The results showed that chlorine releasing agents that frequently used for disinfection of water in swimming pool could not affect the positive role of regular swimming on PEFR in asthmatic patients. The results show increase in PEFR in 60.5% and more than 20% of personal best in 27.6% of swimmer after two months regular swimming session. Review of previous literature indicated that swimming has shown to have definite benefits in improving cardiorespiratory fitness in asthmatic children. Swimming has been shown to be less asthmogenic than other forms of exercise.⁶ These findings correspond to other studies which advocate ten weeks exercise in water for asthmatic patients increased in FEV1 in fourteen patients after doing swimming exercise similar results has been reported by Beri et al⁷, Farid et al study also showed asthmatic patients had more powerful and effective inspiration and expiration after eight weeks of aerobic exercises.⁸ Increase in PEFR more than 20% of personal best was seen in 21.9% after one hour swimming and in 27.6% after two months. These findings explain that swimming in indoor pool had no negative effect on airway flow and it can improve lung functions The "pool chlorine hypothesis" suggesting that the increase exposure of children to pool chlorine could be an important lifestyle factor implicated in the rise of childhood asthma in the developed world.⁹ However the results of our study is not in favor of that theory, thus longer study with more samples and complete pulmonary function tests together with scoring symptoms of swimmers are needed for exact role of this sport in asthmatic patients. Variation in PEFR both in short (one hour) and long (two months) time.

in patients with allergic rhinitis and atopic patients with skin manifestation were not significant. Eight (6.25%) of swimmers in this study were obese but one out of eight had asthma and two had allergic rhinitis that had increase in PEFR after two months swimming. Other studies suggest that obese patients benefit from weight loss by improved pulmonary mechanics and a better control of airways obstruction.¹⁰

In conclusion swimming in indoor chlorinated pool not only is less asthmogenic but also it can improve lung mechanics in normal and asthmatic patients.

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