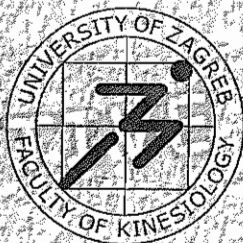


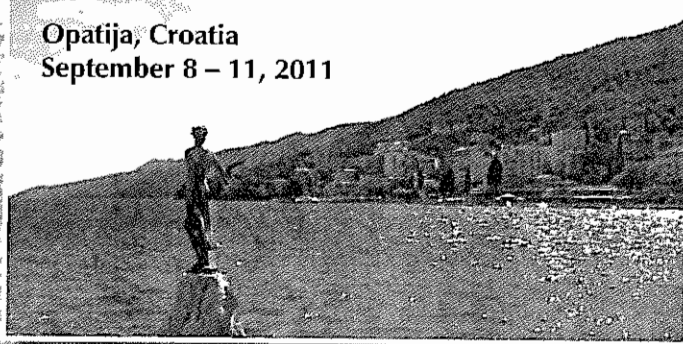
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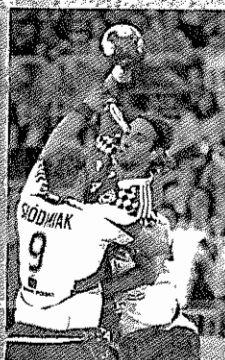
Opatija, Croatia
September 8 – 11, 2011



Proceedings Book

Editors:

Dragan Milanović and Goran Sporiš



Organiser: University of Zagreb, Faculty of Kinesiology, Croatia

Under the patronage of Croatian Academy of Sciences and Arts



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FREQUENCY OF ALLERGIC DISEASES AMONG WRESTLING AND KARATE TRAINEES

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Abstract

The aim of this study was to evaluate differences in the prevalence of subjects with allergic disorders among 189 Greco-Roman wrestling and 124 karate trainees aged 10-16 years. Data about allergic nasal, asthmatic and skin symptoms, and asthmatic symptoms during exercise were recorded and analyzed with chi-square test. The prevalence of rhinitis and eczema was similar in wrestlers and karateka (rhinitis- 21.2% vs 21%; eczema- 6.3% vs 4%, $P>0.05$). The prevalence of asthma was higher in karateka than in wrestlers, but without statistical significance (12.1% vs 6.8%, $P=0.11$). Allergic diseases were present among analyzed trainees in similar proportion as in general male schoolchildren population of Croatia. Results also indicate that wrestling is a less suitable sport discipline for asthmatics than karate, probably due to higher energy consumption, and greater importance of strength and endurance.

Key words: *allergic rhinitis, asthma, exercise-induced asthma, Greco-Roman wrestling, karate*

Introduction

It is well established that common allergic diseases pose some limits to physical activity, particularly those involving respiratory system, like allergic rhinitis and asthma. Consequently, these disorders can interfere with athlete's performance during training and particularly during competition. For allergic persons, the most common pathophysiological problems related to physical activity are exercise-induced asthma and exercise-induced rhinitis, conditions defined as worsening of asthmatic or rhinitic symptoms during, or shortly after the physical activity. Investigations were so far able to define some factors influencing the occurrence of exercise-induced airway disorders. Environmental factors such as low air temperature and humidity, heavy exposure to allergens during exercise (for example to pollens for outdoor activities or to dust mites for indoor activities), or physical performance in areas polluted with respiratory irritants like sulphur dioxide, nitric oxides, ozone, and cigarette smoke, can provoke or enhance exercise-induced airway problems in athletes. Although the pathophysiology of exercise-induced rhinitis and asthma is not fully recognized, it is known that their occurrence is related to the intensity, duration and the course of exercise, making exercise-induced airway problems more prone with more intensive and longer trainings, and trainings with rapid increase and decrease of the work load. However, investigators are still confused with great variability in occurrence and course of exercise-induced disorders among athletes in different sport disciplines, and influencing factors related to the specific functional, motorical, and technical/tactical demands of different sports are not recognised (Carlsen et al., 2008; Sacha and Quinn, 2011).

Wrestling and karate both belong to polystructural acyclic sport disciplines, with mixed aerobic/anaerobic functional demands. The competitions for both disciplines are in a form of a fight. Duration of karate fight is 1, 1.5 or 2 minutes for age categories 10-16 years. For the same age categories wrestling fight last 4 or 6 minutes (2x2 or 3x2 minutes).

Wrestling is a contact sport characterized with alterations of dynamic, explosive repeating movements and static exertions of big muscle groups, altogether with permanent need to overpower opponent's weight and resistance. It is considered that strength and endurance are the most important motorical components in senior wrestling (Marić et al. 2003; Baić 2006). Wrestling experts also consider that in younger wrestlers (younger boys, boys) coordination is the most important ability. With increase of wrestler age (cadets, juniors, and seniors), importance of coordination decreases and the importance of strength and endurance increases.

Modern karate fight represents a non-contact discipline with performance of controlled punches and kicks against the opponent. Only mild contact of hand or leg with the opponent's trunk, and only touch of leg to the opponent's head are allowed, while any contact of hand with opponent's head is prohibited (hand techniques must be stopped few centimetres from the head). Speed and coordination are considered as most important motorical components of karate training (Kuleš, 1998).

The aim of this study is to establish the prevalence of schoolchildren with allergic disorders among wrestling and karate trainees from sport clubs from Zagreb and surroundings, and to evaluate differences in the prevalence of these disorders between trainees in analyzed sport disciplines.

Methods

The study with cross-sectional design involved a total of 313 male subjects, 189 Greco-Roman wrestling and 124 karate trainees, aged 10 to 16 years, from wrestling and karate clubs from Zagreb and surroundings. The main descriptive characteristics of the study subjects are presented in Table 1.

Data about allergic symptoms were recorded in the form of structured medical interview conducted by the author, a physician and specialist in occupational and sport medicine. All subjects were asked about the presence of allergy-related nasal symptoms (sneezing, rhinorrhea, nasal itching and obstruction not related to common cold), asthmatic symptoms (wheezing, dyspnea, dry cough), asthmatic symptoms during exercise, and skin symptoms (itching, rash, erythema, eczema) during the last 12 month. Subjects who reported at least two nasal, asthmatic or skin symptoms were considered as subjects with allergic rhinitis, asthma or eczema, respectively.

All data were handled, analyzed and presented in accordance with the ethical principles of the Helsinki Declaration, maintaining anonymity of involved subjects.

Table 1. Main characteristics of the studied male subjects

| Subjects | N | Age (years) median (range) |
|--------------------|-----|-------------------------------|
| Wrestling trainees | 189 | 13 (10-16) |
| Karate trainees | 124 | 12 (10-16) |
| Total | 313 | 13 (10-16) |

Statistical analysis was done by programme Statistica 5.0 for Windows with methods of descriptive statistics, and non-parametric procedure (chi-square test, Yates correction for samples less than 10) for testing differences in the prevalence of allergic symptoms related to localization of symptoms and evaluated sport discipline. A value of $P < 0.05$ was considered statistically significant.

Results

In this study, 90/313 (28.75%) subjects, 54/189 (28.6%) wrestlers and 36/124 (29 %) karateka, reported the presence of allergic rhinitis, asthma and/or eczema. Allergic rhinitis was reported in 66/313 (21.1%) subjects, asthma in 28/313 (8.9%) subjects and eczema in 17/313 (5.4%) subjects. The prevalence of reported allergic disorders separately in wrestlers and karateka are presented in Figure 1. The prevalence of rhinitis and eczema were similar in wrestlers and karateka (rhinitis- 21.2% vs 21%, $P > 0.05$; eczema- 6.3% vs 4%, $P > 0.05$). The prevalence of asthma was higher in karateka than in wrestlers, but without statistical significance (12.1% vs 6.8%, $P = 0.11$). Accordingly, occasional exercise-induced asthmatic symptoms were reported in 7/124 (5.6%) karateka, and in 7/189 (3.7%) wrestlers.

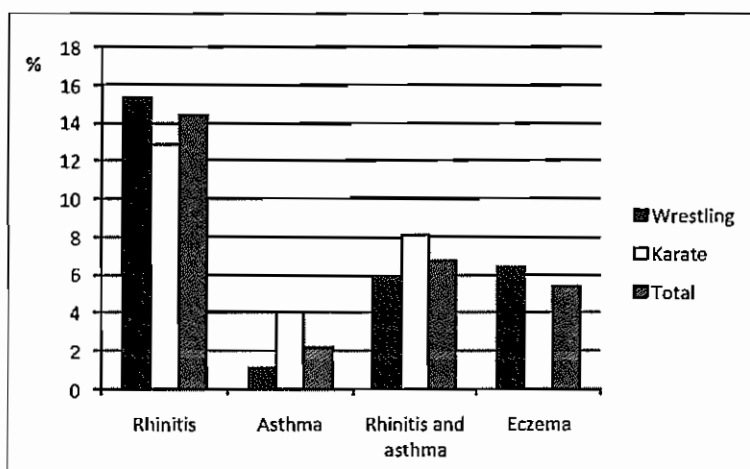


Figure 1. The prevalence of wrestling and karate trainees with reported allergic disorders.

Discussion and conclusions

Exercise-induced breathing problems are relatively common in athletes, including those with top international performance. However, the frequency of athletes with such problems varies among different sport disciplines due to the involved environmental factors, and exercise structure. It is known that exercise in cold air and exercise with endurance demands are the most favourable conditions for the occurrence of exercise-induced rhinitis or asthma. It was shown that the prevalence of athletes with exercise-induced breathing problems during the summer Olympic Games was highest in cycling, triathlon, modern pentathlon and rowing, and during the winter Olympic Games in cross-country skiing, speed skating, nordic combined, short-track skating and biathlon. Expectedly, the prevalence of athletes taking medications to control exercise-induced airway disorders was higher in winter games 2006 than in summer games 2004 (8.3% and 4.6%, respectively) (Carlsen et al., 2008). Swimming is recommended as a most suitable sport for asthmatic athletes because the exercise is performed in warm and humid environment. That is why the proportion of asthmatics is often higher among swimmers (including elite athletes) in comparison with other sport disciplines. However, there is an increasing number of studies suggesting that swimming should also be regarded as a discipline involving some risk factors for the occurrence or progression of airway diseases, like inhalation of chlorine compounds mixed with water droplets (Haahtela et al., 2008).

In this study, we analysed the prevalence of schoolchildren with allergic diseases among Greco-Roman wrestling and non-contact karate trainees. Results show that the prevalence of allergic diseases, particularly rhinitis and eczema, among wrestling and karate trainees was similar to the prevalence of these diseases in general male schoolchildren population of Croatia (Munivrana et al., 2007). Both analyzed disciplines can be considered suitable for persons with allergic rhinitis and eczema, with no observed selection or exclusion of schoolchildren with these allergic diseases among wrestling and karate trainees. Our previous study also suggested that non-contact karate is a suitable sport discipline for physical and psychological conditioning of allergic children and adolescents, including those with asthma (Romić et al., 2008). However, in this study the proportion of asthmatic children was lower among wrestlers than among karateka (6.8% and 12.1%, respectively). This difference did not reach statistical significance, bearing in mind that the number of asthmatics was relatively small, thus influencing the power of statistical analysis. Wrestling and karate represent sport disciplines which are not considered as particular risk for the occurrence of exercise-induced airway problems. Their training sessions and competitions are performed indoors, in conditions of regular room temperature and humidity, and without exposure to indoor pollutants and allergens. In case of wrestling, air humidity in training rooms can be very high. However, disciplines have some differences in structure which could influence the involvement of asthmatics into a training process. Wrestling represents a contact sport with permanent efforts to overpower the opponent's weight and resistance. On the contrary, karate is a non-contact discipline with exchange of controlled punches and kicks. Duration of fights is significantly longer in wrestling than in karate. Therefore, wrestling fight demands higher energy consumption, strength and endurance than karate fight, making karate more suitable for training of asthmatics. It is also possible that the age of analyzed trainees influenced the results of this study. It was shown that importance of strength and endurance in wrestling increases with age of trainees, suggesting that greater difference between proportion of asthmatics in wrestlers and karateka should be expected in older trainees. Therefore, the age of analyzed subjects could pose another reason why the observed difference in proportion of asthmatics between wrestlers and karateka in this study did not reach statistical significance (Marić et al. 2003; Baić 2006).

In conclusion, the results show that the prevalence of allergic diseases, particularly rhinitis and eczema, among wrestling and karate trainees was similar to the prevalence of these diseases in general male schoolchildren population of Croatia. Study also indicates that wrestling is less suitable sport discipline for asthmatic persons than karate, probably due to its contact nature, higher energy consumption, and greater importance of strength and endurance. Study results are in line with other studies suggesting that different structure and demands of certain sport disciplines can influence the involvement of asthmatic athletes into training process. Further investigations in older age categories of wrestlers are indicated due to changes in motorical demands related to wrestler's age (greater importance of strength and endurance in older wrestlers), and specific environmental conditions for training (high air humidity).

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