An Analysis of Risk of Developing Upper Respiratory Track Infections in Athletes Doing Sports in Indoor and Outdoor Courts

Emrah Yılmaz, Hürmüz Koç, Mustafa Karakuş and Mehmet Çebi

Abstract: This study aimed at examining the risk of developing upper respiratory tract infections in athletes doing sports in indoor and outdoor courts. The study covered 200 volunteer athletes between the ages of 17 and 20 – 100 football players, 50 handball players and 50 basketball players. In this study, researchers reviewed the archive in the drugs database system of Social Security Institution (SSI) after taking the ID numbers of athletes, their families and club managers within their knowledge and consent. After the above-mentioned review, researchers identified the drugs used for upper respiratory tract infections in the drugs usage inventories. This study revealed that, out of the 100 athletes who do sports in outdoor courts, 61 athletes use drugs whereas 39 athletes do not do so. In the group of athletes doing sports in indoor courts (100 athletes), 85 athletes used drugs whereas 15 athletes did not do so. The data obtained were processed by means of the IBM SPSS (Statistical package for social sciences) Statistics 21.0 software package. Statistics were presented in unit numbers (n), percentages (%), median and minimum and maximum values. In statistical analysis of data, the chi square test of independence was applied to define the correlation between two variables while the Mann – Whitney U test was used to make a comparison between the groups. The value of $p<0.05$ was accepted as statistically significant. The study has revealed that the athletes doing sports in indoor courts are under a higher risk. As a conclusion, we consider that the athletes doing sports in indoor courts are under a higher risk due to the dust particles on the floor of and all around the court and the hazardous substances therein.

Key words: Upper Respiratory Track Diseases • Indoor • Outdoor • Sports • Courts

INTRODUCTION

The most common disease that affects the public health is the Upper Respiratory Tract Infections (URTI). Although most of these diseases do not pose any vital threat, they result in a high loss of workforce. Having a wide variety of agents for these diseases, most of the agents are viruses. Today, there are more than 200 viruses identified to cause respiratory tract infections. The most common ones are rhino sinusitis [1], rhinitis [2], influenza [3, 4], Otitis Media [5-7] and Tonsillo-pharyngitis [8-10]. Nevertheless, all of these viruses do not cause diseases at the same frequencies. It is only through detection and identification of the virus agent to make a final diagnosis and to conduct an effective treatment of these diseases clinical symptoms of which are fairly similar to one another.

Today, there are three main methods in laboratory diagnosis of these diseases: detection of viruses or antigens directly from disease materials, isolation of virus by cell culture method and seeking antibodies by means of serological methods. However, antibiotics are often employed in treatment of upper respiratory tract infections without any laboratory analysis or an accurate identification of the aetiologi agent, which does not bring any benefit for treatment of the illness, adversely affects the national economy and facilitates development of resistant bacterial strains [11].

URTI may manifest itself as infections due to various aetiological agents such as bacteria and viruses in various clinical pictures that vary according to age, season and geographical attributes as well as the anatomic area. More than 90% of all URTIs stem from viruses [12, 13].

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We assumed in this study that the incidence rate for upper respiratory tract infections would be higher in athletes who do sports in indoor courts due to bacteria, viruses and dust particles while athletes doing sports in outdoor areas might also develop upper respiratory tract infections due to climatic factors even though they weren’t totally free from the agents such as bacteria, virus or dusts. In the light of the above, we studied the risk of developing upper respiratory tract infections in athletes doing sports in indoor and outdoor courts.

**MATERIALS AND METHODS**

The study covered 200 volunteer athletes between the ages of 17 and 20 – 100 football players, 50 handball players and 50 basketball players. The group of athletes doing sports in indoor courts was composed of basketball and handball players (ID) while the group of athletes doing sports in outdoor courts consisted of football players (OD). Researchers visited the clubs of the participating football, basketball and handball players and met the athletes and club managers at their clubs. They took the ID numbers of the athletes within the knowledge and consent of their managers and families and reviewed the drugs database system of the Social Security Institution to find an inventory of the drugs used by the athletes within the last two years. The archive review revealed the drugs employed for upper respiratory tract infections and who used them. When we analyze the distribution of athletes by drug taking percentages, we figured out that out of the 100 athletes who do sports in outdoor courts, 61 athletes used drugs whereas 39 athletes did not do so. In the group of athletes doing sports in indoor courts (100 athletes), 85 athletes used drugs whereas 15 athletes did not do so. In our study, we have observed a significant difference in values regarding the development of upper respiratory tract infection as we made a comparison between the group doing sports in indoor courts and those doing sports in outdoor courts $p<0.01$.

When we analyzed the ages of athletes doing sports in indoor and outdoor courts, we found out that the average age of athletes doing sports in outdoor courts is 18 years while those doing sports in indoor courts is 19 years. When we evaluated the ages of two groups, we saw a significant difference between the two groups $p<0.05$.

When we evaluated the groups according to only their drug usage percentages irrespective of the venue of sports, we found 146 athletes are taking drugs and 54 athletes who do not do so. This difference was found to be not statistically insignificant $p=0.203$.

An analysis of the graph would reveal that, as for the age group of 17 years, among athletes who do sports in outdoor courts, those who use drugs outnumber those who do not do so. Again in the same age group, among athletes who do sports in indoor venues, those who used drugs outnumber those who didn’t use drugs. As for the age group of 18 years, among athletes in outdoor venues, it was observed that the percentage of using drugs is slightly lower than that of not using drugs. On the contrary, we observed just the opposite in indoor

### RESULTS

Results of drug usage values of team athletes doing sports in indoor and outdoor courts according to their venue of sports have been summarized in Table 1.

<table>
<thead>
<tr>
<th>Drug usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>n (%)</td>
</tr>
<tr>
<td>No drug usage n (%)</td>
</tr>
<tr>
<td>Outdoor courts</td>
</tr>
<tr>
<td>Indoor courts</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

Table 2: Distribution of age (years) according to the venue of sports

<table>
<thead>
<tr>
<th>n</th>
<th>Medyan (min-max)</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoor courts</td>
<td>100</td>
<td>18 (17-20)</td>
</tr>
<tr>
<td>Indoor courts</td>
<td>100</td>
<td>19 (17-20)</td>
</tr>
</tbody>
</table>

Table 3: Distribution of ages (years) according to the drug usage in total

<table>
<thead>
<tr>
<th>n</th>
<th>Medyan (min-max)</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taking drugs</td>
<td>146</td>
<td>18 (17-20)</td>
</tr>
<tr>
<td>No drug usage</td>
<td>54</td>
<td>18 (17-20)</td>
</tr>
</tbody>
</table>
Graph 1: Distribution of drug usage percentage according to age and venue

athletes. Graphs tell us a significant difference between the percentage of using drugs and that of not using drugs. As for the age group of 19 years, we found that the percentage of using drugs is higher than the percentage of not using drugs in outdoor and indoor athletes. As for the athletes at the age group of 20 years, we found that the percentage of using drugs is slightly higher in outdoor athletes although it is very close to that of not using drugs. Nevertheless, as is the case in all age groups, in this age group, too, the percentage of using drugs is higher than that of not using drugs in outdoor athletes.

DISCUSSION

In this study, it was found out that the risk for developing upper respiratory tract infection is higher in indoor athletes compared to the outdoor athletes. As we figured out that not so many previous studies were conducted on this field so far to compare to our findings, the importance of our study mounts up, but it also brings limitations to our discussion part.

Tan et al. [14] suggested that the virus-borne URTI often recover spontaneously in 3-7 days while active influenza virus recovers spontaneously in 7-14 days. However, the increased shared life in outdoor venues during the winter time also fuels up the risk of communication of the URTI agents [14]. Our findings in this study showed that the indoor athletes have a higher risk of developing URTI. This finding is also supported by the literature. There are pollens, bacteria, various dead and live micro-organisms, erosion dusts and water vapour particles at amounts that vary according to the venue in the outdoor atmospheric air. The above-mentioned particles can penetrate into indoor environments through ventilation systems and infiltration. Bacteria that are mostly 0.4-5 micron in diameter and air-borne viruses that are 0.003 - 0.06 micron in diameter pose a significant threat for people in indoor environments. Circulation of micro-organisms that cause respiratory diseases throughout indoor environments is a serious problem to ensure the indoor air quality. It has been extremely necessary to analyze the indoor air microbiologically and to find appropriate engineering solutions to ensure the indoor air quality at given standards [15].
Findings of this study showed that the circulation of micro-organisms that are referred to in the literature as agents of respiratory diseases is a serious problem for ensuring the indoor air quality. This suggestion is also supported by our findings.

As the legionnaire’s disease is a dangerous and lethal one that is transmitted through infiltration of micro-organisms that develop within the air pool of an air-handling unit of an air-conditioner into the air circuit, people who inhale the air filtered through such an air-conditioner face a very serious threat for their lives. Because sports halls are mostly heated and cooled by chemical methods, the above-mentioned health risk factors also turn up the risk for indoor athletes to develop URTIs [15].

Amman et al. [16] suggested that there are pollens, bacteria, various dead and live micro-organisms, erosion dusts and water vapour particles at amounts that vary according to the venue in the outdoor atmospheric air naturally. Indoor venues are where people spend nearly 80-90% of their times. Factors such as heat, noise and lights as well as the air in the environment have an impact on well-being, comfort and efficiency of people living there. However, the reason why this impact is often underestimated is that the effects of indoor air pollution take time to manifest themselves and do not pose a direct or urgent threat to life or health [17].

Definition of problems related to indoor environments happened to emerge in early 70s when austerity measures were implemented on energy resources after the oil crisis. As energy costs went up in line with the increased oil prices, energy efficiency gained more importance, which led people to turn down the ventilation systems in buildings. Buildings were covered by a “shell” which was hardly permeable and windows were constantly kept closed [17]. The increased risk factors for URTI in sports halls were therefore accompanied by an increased risk for the indoor athletes to develop these diseases. Our study highlighted the lower drug usage percentages of outdoor athletes due to URTI though it is a slight difference.

Vaizadoğlu et al. [18] stated that there are many air pollutants in indoor environments, especially in buildings and sports halls. Some indoor air pollutants basically originate from outdoors whereas some also have roots in indoor venues as well. They include inhalable particles that are hung in the air, sulphur dioxide (SO2), nitrogen dioxide (NO2), carbon monoxide (CO), photo-chemical oxidants, lead and some other oxidants. These substances might cause headache, lack of appetite and eye, nose and throat irritation and upper respiratory track irritation symptoms. Considering the fact that 61% of indoor athletes use drugs, we can suggest that they use drugs for throat irritation and upper respiratory track irritation. Literature information also confirms that athletes who do sports in indoor venues have a higher risk to develop throat irritation and upper respiratory track irritation. Communication of diseases is far easier among people who share the same indoor environment due to an overcrowded environment and bad living conditions [18].

Given the fact that there are athletes and tens of thousands of spectators in sports courts, it is easier for the disease agents to get transmitted in indoor venues. As a conclusion, it is considered that the increased risk for indoor athletes stems from the dust particles on the floor of and throughout all the indoor court and the hazardous materials therein. We believe that studies with similar content will contribute into the literature and shed light on where experts and coaches should design their trainings and exercises and findings of this study will contribute into the norm study as well. From this perspective, we suggest that further studies with more indoor and outdoor athletes as well as those researching into the athletes who develop URTI at least twice a year in a comparative manner could render more information on how athletes are affected by environmental factors.

**REFERENCES**


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