



## Preparticipation Screening Practices in Different Health Institutions

### *Spora katılım öncesi değerlendirilmede farklı sağlık kuruluşlarının tutumu*

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#### ABSTRACT

**Objective:** Main purpose of preparticipation screening is to prevent sudden death of athletes. Although 14-item history and physical examination practice is suggested by all related international organisations, there is a divergency about implementation of ECG in preparticipation examination. Aim of this study is to investigate preparticipation screening practices in different health institutions.

**Materials and methods:** A personal interview was applied to voluntary athletes who had preparticipation screening in last twelve months. Survey consisted of questions about the experience of athletes in preparticipation screening.

**Results:** A total of 303 athletes included in the study. Most of the athletes admitted to family physician clinics (30.7%). A very high percentage of athletes (54.8%) had not been questioned about their personal or family health history. 40.3% of athletes had ECG tracing. History taking was the lowest in family medicine clinics (22.6%).

**Conclusion:** Preparticipation screening was not standardized. History taking during preparticipation screening was very low. There is a need for a national preparticipation screening guideline.

**Keywords:** Preparticipation screening, ECG, athlete

#### ÖZ

**Amaç:** Spora katılım öncesi değerlendirmenin (SKÖD) temel amacı sporcularda ani ölümü engellemektir. SKÖD'de 14 maddeden oluşan ayrıntılı tıbbi öykünün alınması ve fizik muayenenin yapılması konusunda uluslararası görüş birliği olmakla birlikte EKG tetkiki konusunda yaklaşım farkı bulunmaktadır.

**Gereç ve Yöntemler:** Son 12 ay içerisinde sağlık birimlerinin herhangi birinde SKÖD'e alınan sporculardan gönüllü olanlar çalışmaya katıldı. Sporculara SKÖD deneyimleri ile ilgili sorulardan oluşan bir anket uygulandı.


**Bulgular:** Çalışmaya 303 sporcu katıldı. SKÖD uygulanan sporcuların çoğu (%30,7) aile hekimi sağlık birimlerine başvurmuştu. Sporcuların yarısından fazlasına (%54,8) özgeçmiş ve aile öyküsü sorgulaması yapılmamıştı. Sporcuların yarısından azına (%40,3) EKG tetkiki yapılmıştı. Aile hekimi sağlık birimleri en az tıbbi öykü alan (22,6) birimlerdi.

**Sonuç:** SKÖD uygulamaları standart değildir. SKÖD sırasında sporculardan ayrıntılı tıbbi öykü alma oranları çok düşüktür. SKÖD ile ilgili ulusal bir kılavuza ihtiyaç vardır.

**Anahtar Sözcükler:** Spora katılım öncesi değerlendirme, EKG, sporcu

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## INTRODUCTION

Main objective of cardiovascular screening of athletes during preparticipation physical evaluation is to identify cardiac disorders that may lead to sudden cardiac death and reduce mortality and morbidity (1). For this purpose, American Heart Association (AHA) and American College of Sports Medicine (ACSM) recommend 14-item history and physical examination in preparticipation examination, while European Society of Cardiology (ESC) and International Olympic Committee (IOC) suggest addition of 12 lead ECG to history and physical examination (2). Therefore preparticipation screening practice differs from each other in different countries. Different practices and attitudes of doctors in the same country are reported, as well (3-5).

Although there is not a standardized Turkish guideline for preparticipation screening, Turkish Federation of Family Medicine Associations published a preparticipation screening algorithm (6) and Turkish Medical Association published a preparticipation screening guidebook (7) for family medicine physicians recently. Both are prepared for family medicine physicians by the contribution of sports medicine physicians and history, physical examination and 12 lead ECG in preparticipation examination were suggested.

Athletes do not attend only to family medicine clinics, but also attend to sports medicine clinics, governmental hospitals, primary care centers, athlete training and health research centers (ATHRC) and private hospitals for preparticipation examinations in Turkey. Attitudes of doctors from different specialties that are working in these facilities may differ from each other in preparticipation examinations. Also, doctors' adherence to international guidelines and national guidebook is not known.

Aim of this study is to investigate attitudes of doctors from different type of clinics in preparticipation examinations. For this purpose, a personal interview survey conducted for athletes

## MATERIALS AND METHODS

who had preparticipation screening examination in the past year.

### Study Design and Participants

Voluntary athletes who had preparticipation examination in the last twelve months were included in the study. Athletes who had preparticipation examination at our clinic were excluded.

A personal interview survey applied to voluntary athletes. Places and timelines that surveys conducted were as follows; a university hospital sports medicine clinic between October 2017 and April 2018, İzmir Halkapınar Sports Arena and Atatürk Stadium in January and February 2018, Turkish Athletics National Team Camp at Ankara in February 2018, Turkey Olympics Preparation Center in March 2018, Ankara Sports and Education Research Center in March 2018.

Athletes were asked to complete the survey according to the last place they attended for preparticipation examination. Survey questions are presented in Table 1.

The study was reviewed and approved by Dokuz Eylül University Research and Ethics Committee.

**Table 1.** Survey questions

- |    |  |
|----|--|
| 1. | Did you have a preparticipation screening in the last twelve months?             |
| 2. | Which institution did you attend for preparticipation screening?                 |
|    | a) Sports Medicine Clinic  |
|    | b) Family Medicine Clinic  |
|    | c) Athlete Training and Health Research Center                                   |
|    | d) Primary Care Center   |
|    | e) Governmental Hospital   |
|    | f) Private Hospital  |
| 3. | Did doctor ask you questions about your personal health or your family's health? |
| 4. | Did doctor order an electrocardiogram (ECG)?                                     |
| 5. | Did doctor order blood analysis?   |
| 6. | Did you pay any fee to the institution for preparticipation examination?         |

**Statistics**

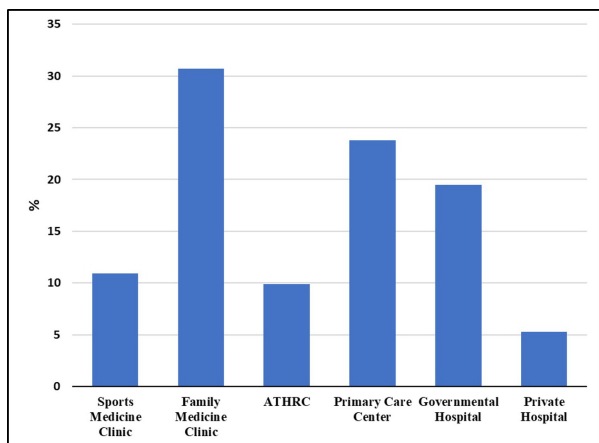
Statistical analysis performed using SPSS 22.0. Categorical data (answers to the survey questions) are expressed as frequencies and percentages.

**RESULTS**

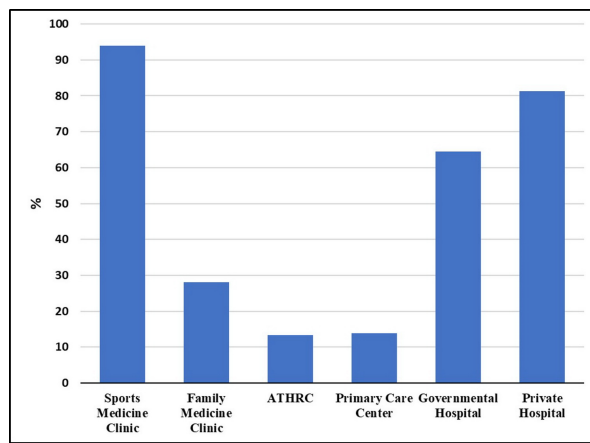
Total of 303 athletes (113 female, 190 male) between 13 and 36 years old were included in the study. Most of the athletes were attended to family medicine clinics, followed by primary care clinics, governmental hospitals, sports

medicine clinics, athlete health centers and private hospitals, respectively (Figure 1).

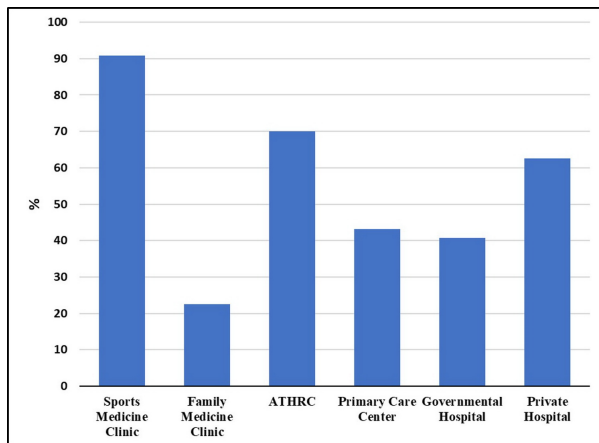
Of all participants 45.2% were asked for personal or family health history (Figure 2), 40.3% had an ECG (Figure 3), 22.8% had blood analysis (Figure 4) and 16.8% paid for preparticipation screening (Figure 5). Sports medicine clinics had the highest percentage for taking history of the patient (90.9%) (Figure 2) and ordering ECG (93.9%) (Figure 3). Blood analysis order (68.8%) (Figure 4) and payment for preparticipation examination (70%) (Figure 5) were highest in private hospitals.



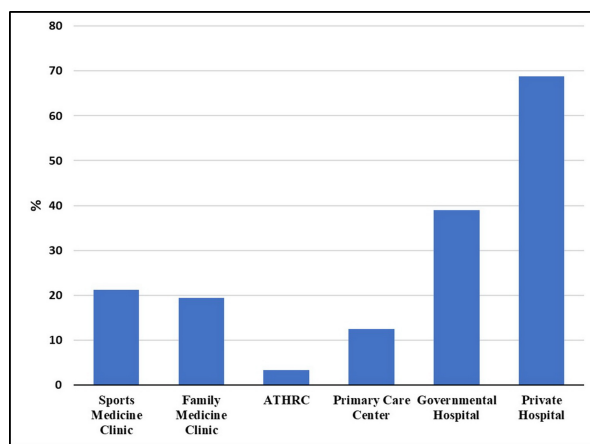
**Figure 1.** Percentages of athletes' attendance to different institutions. (ATHRC: athlete training and health research centers)



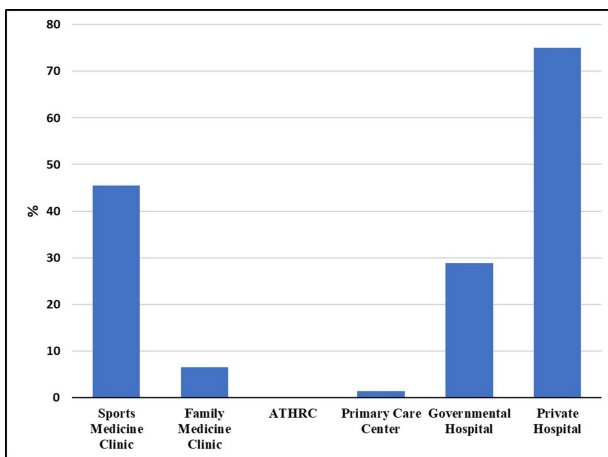
**Figure 3.** Positive answers to "Did doctor order an electrocardiogram (ECG)?" question in different institutions. (ATHRC: athlete training and health research centers)



**Figure 2.** Positive answers to "Did doctor ask you questions about your personal health or your family's health?" question in different institutions. (ATHRC: athlete training and health research centers)



**Figure 4.** Positive answers to "Did doctor order blood analysis?" question in different institutions. (ATHRC: athlete training and health research centers)



**Figure 5.** Positive answers to “Did you pay any fee to the institution?” question in different institutions. (ATHRC: athlete training and health research centers)

## DISCUSSION

The most important and irrevocable part of preparticipation screening is personal (chest pain with exercise, syncope associated with exercise, dyspnea with exertion, heart murmur, high blood pressure) and family (premature death before 50 yr. due to cardiovascular diseases, disability from heart failure at young age or knowledge of specific cardiac conditions in family members) medical history. Both American and European cardiology and sports medicine associations recommend medical history taking in preparticipation screening (1,2). Medical history was not taken from more than fifty percent of our survey participants (Figure 2). Symptoms like syncope and chest pain are warning signs of an underlying cardiac disease. The most common causes of sudden cardiac death in sports are hereditary diseases like hypertrophic cardiomyopathy and arrhythmogenic right ventricular cardiomyopathy (8). Therefore, history of sudden cardiac death in a close relative of the athlete necessitate extensive evaluation of the athlete. This important information can be obtained just by asking to the athlete.

Family physician clinics were the most preferred institutions by athletes for preparticipa-

tion screening in this study. However, medical history taking was the least in family physician clinics. Familiarity of the family medicine physicians to their patients might be the main reason of not taking a medical history but it should have been kept in mind that cardiac diseases like hypertrophic cardiomyopathy might be silent in early ages and cardiac structural changes and symptoms could emerge in advancing ages (9).

A relatively low percentage of history taking reported in United States (US). In a survey of paediatricians and family physicians in Washington, key elements of history taking were assessed; 72% of the physicians were asking for chest pain with exertion, 78% were asking about syncope, 74% were asking about family history of premature death (3).

Using 12 lead ECG as a part preparticipation evaluation is recommended by ESC and IOC (2). In US, usage of ECG is thought as not cost-effective and it is not recommended even though AHA agrees that ECG can increase the diagnostic power of physical examination (10). Turkish Federation of Family Medicine Associations and Turkish Medical Association recommend addition of 12 lead ECG to the preparticipation screening. However, 59.7% of athletes in our study did not have ECG in preparticipation screening (Figure 3). Reason of this may be doctors' personal preference of ECG as a part of examination, absence of ECG machines in the facility or insufficiency to interpret ECG.

Incompliance with national guidelines is not rare. In a large survey of runners, Leyk et al. reported that ECG was performed in 67% of athletes during sports medical examinations in Germany where ECG is obligatory (5). In contrast with American guidelines, 28.5% of team physicians from US National Collegiate Athletic Association reported that they ordered ECG to all athletes (11). Although there is not a Canadian guideline, team physicians in Canada seem to follow American Guidelines. Only 15% and 22% of team physicians have ordered ECG as a part of screening in two different surveys (4, 12).

The cost of preventing one sudden cardiac death was estimated as \$3.4 million and total cost of adding ECG to preparticipation examination was estimated as \$2 billion annually in United States (2). These estimations are special to US. Because of differences in fees, health systems and practices in different countries, these estimations cannot be universalized. For example, in Turkey ECG tracing is free of charge in family physician clinics and primary care centers and costs under \$1 (13) in governmental hospitals while it is \$17 in US (14). Countries like Turkey should prepare a national guideline according to the local needs and resources. This would also ease the homogeneity of practices in preparticipation screening.

Although blood sampling was not a part of preparticipation screening in all guidelines, %22.8 of our participants had blood testing (Figure 4). The highest blood analysis percentage was in private hospitals (68.8%) which is understandable. Because of high frequency of iron deficiency and iron deficiency anaemia in adolescent athletes, hemogram and ferritin analysis seem to be reasonable (15).

A high percentage of our participants attending to private hospitals (75%) had paid for preparticipation screening, which was followed by sports medicine clinics (45.5%) (Figure 5). Family physician clinics, primary care centers and ATHRC are free of charge in Turkey and only 7 of our 195 participants who attended these institutions said they paid a fee for preparticipation screening. Social Security Institution does not cover for preparticipation screening payments, so a higher percentage would be expected in governmental hospitals, sports medicine clinics and private hospitals.

Main limitation of this study is that it's based on memories of athletes rather than official documents. Nevertheless, we believe that our results reflect present practices in health institutions. Also, inclusion of more survey participants and survey locations would give us a chance to compare different locations.

In conclusion, there are differences between practices of different institutions in preparticipation

screening. History taking of athletes are very low in some institutions like family medicine centers which puts lives of athletes at risk. There is a necessity for a national guideline for preparticipation screening which enlightens all aspects of preparticipation screening.

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