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Patient Profile Attending a Sports Medicine Center

Bir Sporcu Sağlığı Merkezinin Hasta Profili

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ABSTRACT

Objective: To investigate admissions to a sports medicine polyclinic in order to demonstrate the regional patient profile.

Materials and Methods: Data (n: 2474) pertaining to athletes/patients who were admitted to the sports medicine polyclinic were evaluated using their digital files. The "Daily Report on Injuries and Illnesses" form put out by the International Olympic Committee was used for the classification of illnesses and injuries.

Results: Among the participants, 70.2% were males; 95% of the applicants were athletes, with 74.1% of the participants being under the age of 18. Most of the applications (44.5%) were made during winter. About 63.0% of the participants applied for licensing examination, 35.9% due to injuries and illnesses, and 1.1% to receive medical support. While the most frequent reason for athletes' application was license examination, sedentary individuals largely applied due to injuries ($p<0.05$). Injuries mostly affected the lower extremities, whereas disease symptoms mainly involved the cardiovascular system. Most injuries had occurred during training, and conservative methods tended to be used for treatment.

Conclusions: Licensing examinations should be carried out in primary health care facilities. Performance analysis should be performed through equipments used in the field of sports medicine. Conservative treatment units should be established. Lastly, it is crucial that sports medicine specialists increase their role in the fight against chronic diseases experienced by sedentary people.

Keywords: Sports medicine, injury, disease, epidemiology

ÖZ

Amaç: Çalışmanın amacı, spor hekimliği polikliniğine bir yıllık sürede yapılan başvuruların incelenmesi ve bölgedeki profilin ortaya konulmasıdır.

Gereç ve Yöntemler: Spor hekimliği polikliniğine başvuran (n:2474) sporculara/hastalara ilişkin veriler dijital arşivden incelendi. Hastalık ve yaralanma başvurularının sınıflandırılması için Uluslararası Olimpiyat Komitesi'nin "Daily Report on Injuries and Illnesses" formundan yararlanıldı.

Bulgular: Başvuranların %70.2'si erkekti, başvuruların %95'i sporcular tarafından yapılmıştı ve %74.1'i 18 yaş altındaydı. Başvuruların %44.5'i kış mevsiminde yapılmıştı. Bireyler %63.0 lisans muayenesi, %35.9 yaralanma ve hastalık, %1.1 tıbbi destek alma nedenleriyle başvurmuştu. Sporcuların en sık başvuru nedeni lisans muayenesi iken sedanter bireyler yaralanma nedenli başvurdu ($p<0.05$). Yaralanmalar en sık alt ekstremiteyi, hastalık semptomları en sık kardiyovasküler sistemi ilgilendiriyordu. Sporcuların en çok antrenmanda yaralandığı saptandı. Tedavi için sıklıkla konservatif yöntemler uygulandı.

Sonuçlar: Lisans muayeneleri birinci basamak sağlık kuruluşlarında gerçekleştirilmelidir. Spor hekimliği alanında kullanılan ekipmanlar sağlanarak

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performans analizi yapılmalıdır. Konservatif tedavi üniteleri kurulmalıdır. Sedanter bireylerde kronik hastalıklar ile mücadele konusunda spor hekimlerinden daha çok destek alınmalıdır.

Anahtar Sözcükler: Spor hekimliği, yaralanma, hastalık, epidemiyoloji

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INTRODUCTION

Physical activity plays a major role in leading a healthy lifestyle, as people who spare time for sports gain significant health benefits (1). Regularly engaging in physical activity has an impact on reducing the risk, and preventing the development of many chronic diseases; including obesity, hypertension and diabetes. Numerous clinical and epidemiological studies report that these impacts display a dose-response relationship (2). In addition to preventing diseases, exercise also has psychological and social benefits. Moreover, exercise has been shown to provide economic benefits through cutting costs related to national healthcare, as the costs associated with illnesses experienced by physically inactive individuals are 30-50% higher (2).

The field of specialization in medicine that deals with the prevention and treatment of such injuries is sports medicine. Sports medicine specialists do not manage only the prevention of injuries and the process of rehabilitation after injuries, but they also carry out participation evaluations prior to sports, apply annual medical testing of athletes, make suggestions for the prevention of chronic diseases and/or the treatment of illnesses, may take charge in health committees of teams, brief on nutrition and anti-doping, and promote the value of exercise to improve health (3).

The identification of the type, localization, speed, and treatment need of sports injuries contributes to improving the quality of service offered by health service providers, and better enables the health needs of athletes and the society to be met accurately and quickly at the national level (2,4).

The expertise of sports medicine has to reflect on specific skills in order to perform effectively. In this branch, the duty area expands when the equipment infrastructure is sufficient. Identifying application reasons is necessary to anticipate needs in the region of concern. There are some studies conducted in different regions. However, epidemiological studies on sports medicine in Turkey are very scarce (5,6).

The aim of this study is to assess applications made over the course of a year to a sports medicine polyclinic located in a metropolitan city with a population of two millions.

MATERIALS and METHODS

Data pertaining to athletes and patients who applied to the sports medicine polyclinic between April 2017 and April 2018 were assessed on digital patient files by a sports medicine specialist. Information included sports branch, details of training, location of injury on body or impacted system, type and reason of injury or disease symptom, timing of injury (during training, competition, other), time elapsed between onset of injury or disease and presentation to the polyclinic, seriousness of injury, diagnosis and treatment processes.

All patients who were examined at the Medical Center for Athletes, and who agreed to participate in the study were included. The researcher has considered in the analyses new presentations to the sports medicine polyclinic for a check-up, and the new examination findings in relation.

The reasons for presentation to the polyclinic were categorized as: 1. License examination (physical examination for participation in sports and general medical examination), 2. Injury and illnesses, 3. Medical counseling (exercise and/or ergogenic support suggestions, anti-doping counseling, and exercise prescription in case of chronic diseases).

The Daily Report on Injuries and Illnesses form put out by the International Olympic Committee was used for the classification of illness and injury applications (7).

The local ethical committee approved the study in the meeting dated 6 June 2018 with resolution number 2018/74.

Statistical Analysis

Statistical analyses were carried out using the Number Cruncher Statistical System 2007 Statistical Software (Utah, USA). Descriptive statistics methods (average, standard deviation, frequency and frequency distributions), as well as Shapiro-Wilk normality test, and distribution of variables were used in the data analysis. For inter-group comparisons without presence of normal distribution, the Kruskal Wallis test was used. For subgroup comparisons, Dunn's multiple comparison test was used; and finally, for group comparisons and qualitative data comparison, Mann-Whitney U test and chi-square test were used, respectively. The significance level for the analyses was set at $p<0.05$.

RESULTS

The study evaluated data of 2474 participants in total (95% of them professional or recreational athletes), 1737 of which were males (70.2%). The percentage of athletes under the age of 18 was higher than that of the sedentary; however, in other age groups, the percentage of sedentary was higher than that of athletes ($p<0.05$). The percentage of female athletes was lower than that of sedentary counterparts ($p<0.05$). Details of data are presented in Table 1.

Table 1. Physical data of participants

	Athletes (n=2352)	**Sedentary** (n=122)	**p value**
Age (yr)	17.1 ± 7.6	35.1 ± 15.9	0.0001*
Height (cm)	163.6 ± 15.6	167.3 ± 10.3	0.0100*
Weight (kg)	56.9 ± 17.8	76.1 ± 17.8	0.0001*
BMI (kg/m^2)	20.7 ± 4.0	27.2 ± 5.9	0.0001*
Male gender	71.3% (n=1676)	50% (n=61)	0.0001*
Female gender	28.7% (n=676)	50% (n=61)	

Data as mean ± SD and %; BMI: body mass index

Compared with the sedentary, the athletes were younger and had lower body mass index ($p<0.05$), (Table 1).

The sport most engaged in by the participants was football & futsal with a rate of 20.3%. This was followed by combat sports (boxing, kick boxing, judo, karate, kung fu, mixed martial arts, muay tai, taekwondo, wushu, and other far east sports) with a rate of 19.2%. Then followed athletics (12.8%), basketball (9.4%), weight lifting (8.2%), swimming and water polo (5.9%), volleyball (4.2%), folk dancing (3.9%), aerobic exercises and fitness (2.9%), wrestling (1.6%), arm wrestling and body building (1.3%), field hockey and paralympics (1.1% each), handball, racket sports (tennis, table tennis, badminton) and other branches (orienteering, shooting, darts, chess) (0.8% each), artistic gymnastics and cycling (0.4% each). The rate for non-athletes was 4.9%. The weekly training duration of the athletes was 8.1±6.4 hours, while their annual training duration was 9.4±4.0 months.

The presentations of athletes to the clinic in winter were statistically higher than those made by sedentary ($p<0.05$). Considering seasonal changes, presentations to the clinics for license examination were mostly done in winter. The number of presentations to the clinic for injuries and diseases in winter was statistically lower than the other seasons ($p=0.001$). The injured part of the body or impacted system, type of injury or symptom of disease, reason of injury or disease, seriousness of injury, and need for

treatment did not display any seasonal differences (p>0.05). The duration of time between presenting to the polyclinic and the onset of injury or disease in winter and autumn was found to be lower than that in summer and spring (p=0.005, p=0.001; p=0.012, p=0.005).

Regarding the reasons for presentation to the polyclinic, 63.0% of the participants came for license examination, 35.9% due to injuries and illnesses, 1.1% to receive medical support. No difference was detected between presentation reasons in terms of gender (p>0.05). While the most frequent reason for athletes who presented to the polyclinic was to undergo physical examination for participation in sports, the most common reason for which sedentary presented was injury (p<0.05).

Regarding the injuries of the athletes, 11.0% (n=86) had them in the head and trunk, 18.2% (n=142) in the upper extremities, and 63.0% (n=491) in the lower extremities. There was a difference between the athlete and sedentary groups in terms of injury incidence in the upper extremities only (p=0.013), (Table 2). There was no difference in the injuries in terms of gender (p>0.05); and there was no difference in the distribution of injury region according to participation experience in sports (p>0.05).

Table 2. Injured body parts

	Body parts	**Athletes** (n=719)	**Sedentary** (n=97)
Head and trunk	**Neck / cervical spine**	1.28 % (n=10)	3.42 % (n=4)
	Thoracic spine / upper back	0.51 % (n=4)	0.85 % (n=1)
	Sternum / ribs	1.03 % (n=8)	1.71 % (n=2)
	Lumbar spine / lower back	7.19 % (n=56)	6.84 % (n=8)
	Pelvis / sacrum / buttocks	1.03 % (n=8)	0.85 % (n=1)
Upper extremity	**Shoulder / clavicle**	6.16 % (n=48)	4.27 % (n=5)
	Upper arm	0.64 % (n=5)	-
	Elbow	4.36 % (n=34)	3.42 % (n=4)
	Forearm	0.64 % (n=5)	-
	Wrist	4.49 % (n=35)	0.85 % (n=1)
	Hand	0.64 % (n=5)	-
	Finger	1.28 % (n=10)	-
Lower extremity	**Hip**	2.44 % (n=19)	3.42 % (n=4)
	Groin	1.80 % (n=14)	-
	Thigh	10.9 % (n=85)	-
	Knee	28.9 % (n=225)	45.3 % (n=53)
	Lower leg	7.57 % (n=59)	1.71 % (n=2)
	Achilles tendon	1.03 % (n=8)	0.85 % (n=1)
	Ankle	6.55 % (n=51)	5.98 % (n=7)
	Foot / toe	3.85 % (n=30)	3.42 % (n=4)

Data as % (n)

In terms of the most injured regions, statistically significant differences were seen in injuries suffered in the lower extremities while participants were engaged in athletics and football-futsal (each p=0.001), and in the upper extremities while participants were engaged in weight lifting

(p=0.001), volleyball (p=0.01), arm wrestling and body building (p=0.001), and artistic gymnastics (p=0.002) (p<0.05), (Table 3). In presentations related to disease symptoms, the most affected area was the cardiovascular system in the athletes. Complaints made by the sedentary who presented to the clinic with disease symptoms differed from those of the athletes in that they largely involved the metabolic or endocrine systems (p=0.001), and the musculoskeletal system (p=0.001).

Table 3. Injured body part according to sports branch (n=719)

	Injured body part			p value
	Head and trunk	**Upper extremity**	**Lower extremity**	
Aerobic exercise-fitness	6.98 % (n=6)	2.11 % (n=3)	7.33 % (n=36)	0.070
Athletics	23.3 % (n=20)	4.93 % (n=7)	29.1 % (n=143)	**0.001***
Basketball	1.16 % (n=1)	2.11 % (n=3)	4.28 % (n=21)	0.200
Soccer & indoor football	11.6 % (n=10)	6.34 % (n=9)	30.6 % (n=150)	**0.001***
Martial arts	9.30 % (n=8)	4.23 % (n=6)	8.15 % (n=40)	0.200
Weight lifting	34.9 % (n=30)	53.5 % (n=76)	8.55 % (n=42)	**0.001***
Artistic gymnastics	-	2.11 % (n=3)	-	**0.002***
Swimming & water polo	-	0.70 % (n=1)	1.22 % (n=6)	0.500
Racket sports	-	-	0.81 % (n=4)	0.400
Volleyball	1.16 % (n=1)	9.15 % (n=13)	3.67 % (n=18)	**0.010***
Handball	-	1.41 % (n=2)	1.02 % (n=5)	0.600
Arm wrestling & bb building	3.49 % (n=3)	7.75 % (n=11)	0.61 % (n=3)	**0.001***
Cycling	2.33 % (n=2)	-	0.61 % (n=3)	0.100
Field hockey	1.16 % (n=1)	0.70 % (n=1)	1.22 % (n=6)	0.900
Paralympics	-	0.70 % (n=1)	0.81 % (n=4)	0.700
Wrestling	4.65 % (n=4)	4.23 % (n=6)	1.63 % (n=8)	0.090
Others	-	-	0.41 % (n=2)	0.600

Data as % (n); Paralympics: paralympic aerobic-fitness, para athletics, wheelchair basketball, para-arm-wrestling, para bowling, amputee football, para powerlifting, para taekwondo, sitting volleyball, para swimming; *: statistical significance (p <0.05).

In assessing injury and disease presentation rates of the athletes who played football-futsal, it was found that their presentations due to injury were higher than those due to disease (p=0.003). Recreational athletes who participated in aerobic exercises or fitness, and athletes who participated in combat sports presented more to the polyclinic due to disease (p=0.007, p=0.007). There was no difference in presentations due to injury and disease in the other sports branches (p>0.05).

The injury types of the patients and their main symptoms, outside of those patients who were determined to be healthy, are shown in Table 4. The most frequent and classifiable injury type in the athletes was strain, and the most frequent symptom was palpitation. The sedentary mostly had meniscus or cartilage lesions as classifiable injuries, and pain and dyspnea or cough as symptoms of diseases.

In the examination in terms of injuries, both athletes and sedentary were found to have mostly overuse related minor injuries. The main cause of diseases was exercise-induced in athletes, and recurrence of an existing disease in sedentary. Injuries or diseases occurred in 60.2% (n=465) of cases involving athletes during training; and

in 25.0% (n=193) of cases involving athletes during competition.

There was a difference between the injury fields of athletes and sedentary (p<0.05). A difference arose between the groups regarding frequency; since the athletes presented to the clinic in 36.5±55.8 days on average, while the sedentary presented in 90.9±8.0 days (p=0.001). Moderate and severe injury rates in the sedentary group were significantly statistically higher than those in the athlete group (p<0.05). While the loss period associated with the injuries suffered in athletics and weight lifting was low, the loss period associated with the injuries suffered in basketball and football-futsal was higher (p<0.05).

Table 4. Type of injury (diagnosis) and main symptoms

State	Injury type or symptom	**Athlete** (n=2352)	**Sedentary** (n=122)
	Healthy	60.6 % (n=1425)	2.46 % (n=3)
Injury	**Nerve injury / spinal cord injury**	0.89 % (n=21)	5.74 % (n=7)
	Sprain (injury of joint and/or ligaments)	4.97 % (n=117)	9.02 % (n=11)
	Strain / muscle rupture / tear	5.87 % (n=138)	1.64 % (n=2)
	Stress fracture (overuse)	0.17 % (n=4)	0.82 % (n=1)
	Tendinosis / tendinopathy	3.27 % (n=77)	2.46 % (n=3)
	Arthritis / synovitis / bursitis	1.49 % (n=35)	2.46 % (n=3)
	Other bone injuries	3.44 % (n=81)	4.92 % (n=6)
	Dislocation, subluxation	0.30 % (n=7)	0.82 % (n=1)
	Fasciitis / aponeurosis injury	0.38 % (n=9)	1.64 % (n=2)
	Fracture (traumatic)	0.64 % (n=15)	-
	İmpingement	0.77 % (n=18)	4.10 % (n=5)
	Muscle cramps or spasm	1.23 % (n=29)	0.82 % (n=1)
	Contusion / haematoma / bruise	0.72 % (n=17)	3.28 % (n=4)
	Laceration / abrasion / skin lesion	0.17 % (n=4)	-
	Ligamentous rupture	3.23 % (n=76)	13.9 % (n=17)
	Lesion of meniscus or cartilage	1.53 % (n=36)	16.4 % (n=20)
	Tendon rupture	-	1.64 % (n=2)
Illness	**Pain**	0.30 % (n=7)	1.64 % (n=2)
	Palpitations	0.38 % (n=9)	0.82 % (n=1)
	Dyspnea, cough	0.21 % (n=5)	1.64 % (n=2)
	Lethargy, dizziness	0.26 % (n=6)	-
	Syncope, collapse	0.13 % (n=3)	-
	Other	9.06 % (n=213)	23.8 % (n=29)

Data as % (n)

Following examination, conservative treatment methods were planned first for 96.2% (n=742) of the athletes and 94.4% (n=102) of the sedentary. Surgical treatment was offered to 3.8% (n=29) of the athletes and to 5.6% (n=6) of the sedentary. There was no difference in treatment needs between athlete and sedentary groups (p=0.372). However, regarding gender differences, while 99.0% of the females (n=204) preferred conservative treatment, 95.2% of the males (n=538) preferred conservative treatment (p=0.014).

DISCUSSION

The epidemiological characteristics of injuries associated with sports may differ according to the group examined. For instance, presentations to the hospital or emergency service, and seasonal injury profiles of any branch are not expected to be the same. In reference to the literature; a study conducted in Australia indicated that men and children/young people presented to hospitals at higher rates. According to age group categorizations, presentations to sports medicine clinics decrease as age increases. More than 40% of injuries were caused by teammates of the athletes, and most injuries occurred due to falling down upon or crashing into opponents. Many sports injuries were of the overuse injury type; with fractures, dislocations, sprains and strains being commonly diagnosed (4).

Emergency service was needed in 36.6% of the applications involving individuals in the 5-14 year age group (65.9% males), and 30.0% in the 15-24 year age group (73.5% males). Injuries happened most frequently in football (24.0%), cycling (15.0%), and basketball (17.5%). Regarding the injured body regions, 39.0% were in the upper extremity, 31.2% in the lower extremity, 20.1% in the head and face, and 5.6% in the trunk (8). Cassell et al. reported that most sports injuries (23.3%) were diagnosed as sprains and strains, and that 86.0% of the cases required less than two days of hospitalization for treatment (8). The present study displayed similarities in terms of data gathered concerning gender, age, injury type, and treatment need.

Another cross-sectional study conducted in an emergency service department investigated the applications of patients older than 16 years of age from February to April and found that 2.7% of all cases had sports-related injuries. Men were found to be at a 9-to-1 greater risk compared with women. Applications made by 16-20 years old individuals of both genders were the highest. It has been shown that applications for sports injuries start to decrease particularly after 30 years of age. Among all participants, 70% had soft tissue injuries. The most affected body region was the lower extremity (60%), followed by the upper extremity (25%), the head and neck region (10%), and the trunk (4%), (9). Ankle sprain injuries (19%) were found to be the most frequent injury type; 67% of the cases were treated in the emergency care department, 25% were transferred to the relevant department, and 3% were transferred to physiotherapy (9).

Nearly half of the athletes had sports injuries, according to a monocenter study data that monitored futsal, handball, basketball, volleyball, softball, athletics, football, rugby, water polo and combat sports (judo and karate) athletes (10). The injury incidence did not differ by gender. Particularly, the most injured region of the athletes (88.6%) who played football (78.8%) was the lower extremity (55.8%). All of the injuries in the upper extremity were seen in water polo (100%) and softball (75%) athletes. The most frequent injury type was anterior cruciate ligament injury (12.7%), followed by ankle ligament injury (12.0%). Conservative treatment was applied in most cases (72.9%). Male athletes in volleyball (53.0%) mostly preferred to undergo surgical treatment (10).

A study investigating the applications made to a sports medicine clinic based on gender reported that 31% of the applications were made by females who were younger than the males. Females had lower rates of acute dislocation, contusion and fracture diagnoses than males, and they had sports injuries (compartment syndrome, stress fracture, entrapment neuropathy, etc.) related to stress at higher rates. The rates of tendinitis, bursitis and apophysitis were similar by gender. While knee, ankle and waist region were injured at similar rates, women had more metatarsus, big toe, and sole injuries than men. Recovery time after injury was less than a week for 89% of females and 91% of males, while 4% of women and 6% of men required surgical treatment (11).

Stevenson et al. (12) found that of all the athletes examined throughout the winter, 51% suffered an injury at least once, with 58% of the injuries being moderate and 40% being minor. The injuries occurred most frequently in football, field hockey, and basketball athletes; and took

place particularly in the first four weeks of the season. Athletes who were between the ages of 26 and 30 had a 55% greater risk of injury than the athletes who were under 18 years of age.

In the reports they presented from their 16-year injury surveillance data, Hootman et al. (13) found that the formation rate of injuries during competitions was higher than those incurred from trainings, and there were more injuries during preparations before the season than those occurring either during the season or in post-season trainings. They added that there was no change in injury rates throughout the period of sixteen years. On the other hand, the present study revealed that injury rates did not differ significantly on the basis of seasons, and the duration for applications to the polyclinic for injuries in the winter and spring was shorter. This difference indicated that the individuals searched for treatment more quickly during these seasons. The present study further found that the injury rates of athletes, particularly during training, were greater than the injuries rates related to competitions. This could be an indication of athletes not engaging in enough warm-up and cooling-down activities and not adapting protection programs effectively.

Data derived from a study in Turkey evaluating injury applications made to a sports medicine clinic by non-athletes are similar to the findings from this study. The researchers in the mentioned study reported that 52.4% of the non-athlete cases were males, and 47.6% were females, and that the most frequent musculo-skeletal system complaints were related to the knee region. The primary reasons for the ankle-related complaints were stated to be patello-femoral pain syndrome, and anterior cruciate ligament injury (5). Non-athlete men and women application rates in this study were equal. Although Tahirbegolli et al. (5) used a different system for injury and disease classification, the present study indicated that most of the complaints were related to the lower extremity (60.7%) in the non-athlete group. Meniscus injuries and cartilage lesions constituted the most frequent injury types in non-athletes.

In addition to injuries, disease symptoms also result in loss of time for athletes. Highly intense and long-term trainings and competitions increase the emergence of disease symptoms that cause changes in the immunological system. Disease symptoms develop in 6-17% of athletes in international sports organizations in a period shorter than four weeks, and female athletes in particular are more affected by these symptoms. Throughout these organizations, 50% of the diseases impact the inhalation system, followed by the gastrointestinal tract, the dermatological and genitourinary systems. Infection is the most frequent reason for the onset of the diseases (14).

In the literature search conducted before this study, no study focusing on disease symptoms in sports medicine clinic applicants was found. Data compiled in this study differed from that of diseases reported in international organizations. Since the study was carried out under clinical conditions, different data had to be obtained compared with epidemiological data during competitions.

The research was limited in the sense that it was conducted concentrically, and a retrospective analysis was performed, despite being identified as a prospective study. Although the data of this research are not an epidemiological reflection of sports medicine clinics throughout Turkey, they are nonetheless important insofar as they demonstrate the profile of the region.

CONCLUSION

Regionally, license examinations should be completed in primary health care facilities. Performance analysis should be performed by providing the equipments used in the field of sports medicine. Conservative treatment units should be established. Finally, sports medicine specialists should increase their part in the fight against chronic diseases in sedentary individuals.

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