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## PRIVILEGE

“Bu Dergi Türk Patent Enstitüsü Tarafından Marka Tescili İle Tescillidir”

(2015/04313-2015-GE-18969)



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# İÇİNDEKİLER

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## ARAŞTIRMA ve UYGULAMA

**THE EFFECT OF PERCEIVED CORPORATE SOCIAL  
RESPONSIBILITY ON THE BRAND EQUITY FOR  
SPORTS BRANDS** 1-24

*Hakan ÜNAL*

**EVALUATION OF ANTI-TRICHOMONASE  
ACTIVITIES OF METHANOL EXTRACT OF  
Hypericum scabrum L.** 25-33

*Necati OZPINAR, Hulya OZPINAR, Nuraniye ERUYGUR,  
Tuğba KAYA*

**ANALYSIS OF NUTRITION INFORMATION OF  
ATHLETES COMPETING IN INTERCOLLEGIATE  
WRESTLING TURKEY CHAMPIONSHIP** 34-51

*Hayrettin GÜMÜŞDAĞ, Alpaslan KARTAL, Erol BAYKAN*

**SEROPREVALANCE OF *Toxoplasma gondii*  
INFECTION AMONG PSYCHIATRIC DISEASES** 52-60

*Necati OZPINAR, Tuğba KAYA, Zekeriya YELBOGA,  
Nuryil YILMAZ, Semra OZCELIK*

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- ✓ DAHİLİ TIP BİLİMLERİ
- ✓ DOPİNG VE ERGONOJİK YARDIM
- ✓ DİĞER TIP BİLİMLERİ
- ✓ ERİŞKİN VE PEDIATRİK DÖNEM SPOR TRAVMATOLOJİSİ
- ✓ FİZİK TEDAVİ VE REHABİLİTASYON
- ✓ HEMŞİRELİK BİLİMLERİ
- ✓ ORTOPEDİ VE TRAVMATOLOJİ
- ✓ PSİKOLOJİ VE PSİKİYATRİ
- ✓ SAĞLIK YÖNETİMİ
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- ✓ SPORCU PSİKOLOJİSİ
- ✓ SPORCU SAĞLIĞI
- ✓ SPORCUDA FİZİKSEL TESPİT EDİLEN KAS İSKELET PROBLEMLERİ
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- ✓ TEMEL TIP BİLİMLERİ
- ✓ TIBBİ BİYOLOJİK BİLİMLER
- ✓ TIP TARİHİ ve ETİK
- ✓ YAŞLILIK DÖNEMİ SPORCU SAĞLIĞI
- ✓ İŞ GÜVENLİĞİ VE ÇALIŞAN SAĞLIĞI

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In this issue of our journal, there are a total of 04 research and application studies. In this issue of the journal, we would like to express our sincere thanks to the authors who support us with their valuable studies. We would also like to express our thanks and appreciation to the precious arbitration committee members who never leave us alone and enable this issue to meet with our dear readers with their wonderful efforts and contributions, as they have done in each issue. We also greatly appreciate the efforts of the editorial board, system management, and the precious scholars taking place in the editorial board for making an effort in the background of the publication of this journal. Dear scientists, we still continue our applications and works to enable our journal to be in different indices. Our announcements about the evaluation of the studies published in our journal to be assessed by different readers and literatures also still continue. We have also speeded up our communication studies and the delivery of the journal and its issues to scientists and scholars all around the world. We thank you for your support and contributions already, and we pray for reconciliation.

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THE EFFECT OF PERCEIVED CORPORATE SOCIAL RESPONSIBILITY  
ON THE BRAND EQUITY FOR SPORTS BRANDS <sup>(1)</sup>SPOR MARKALARINA YÖNELİK ALGILANAN KURUMSAL SOSYAL  
SORUMLULUĞUN MARKA DENKLİĞİ ÜZERİNE ETKİSİ*Hakan ÜNAL**Mugla Sıktı Koçman University, Faculty of Sport Sciences, İstanbul / Turkey**ORCID ID: 0000-0002-4570-6205*

**Öz: Amaç:** Bu çalışmada, spor markalarına yönelik algılanan kurumsal sosyal sorumluluğun marka denkliği üzerine etkilerini araştırmak üzere, hedef kitlelerinin bu konudaki tutumlarını tespit edilmesi amacıyla yapılmıştır. Araştırma, Muğla Sıtkı Koçman Üniversitesi Spor Bilimleri Fakültesi öğrencilerinden 260 öğrenciyi kapsamaktadır. **Yöntem:** Öğrencilere uygulanan anket formu, demografik nitelikler, spor markası tutum ölçeği ve marka denkliği ölçeğinden oluşturulmuştur. Verilerin değerlendirilmesinde tanımlayıcı istatistiksel yöntemleri olarak sayı, yüzde, ortalama, standart sapma kullanılmıştır. İki bağımsız grup arasında niceliksel sürekli verilerin karşılaştırılmasında t-testi, ikiden fazla bağımsız grup arasında niceliksel sürekli verilerin karşılaştırılmasında Tek yönlü (One way) Anova testi kullanılmıştır. Anova testi sonrasında farklılıkları belirlemek üzere tamamlayıcı post-hoc analizi olarak Scheffe testi kullanılmıştır. Araştırmanın sürekli değişkenleri arasında pearson korelasyon ve regresyon analizi uygulanmıştır. **Bulgular:** Öğrencilerin algılanan sosyal sorumluluk ortalamalarının zayıf, spor markasına yönelik tutumlarının orta, marka farkındalığı, algılanan kalite ve marka çağrışımı ortalamalarının zayıf, marka sadakati puanlarının ortalamasının ise orta düzeyde olduğu belirlenmiştir. Algılanan Kurumsal sosyal sorumluluk ile marka denkliğinin bütün unsurları arasında pozitif yönlü anlamlı bir ilişki ortaya çıkmıştır. **Sonuç:** Elde edilen sonuçlara göre, algılanan kurumsal sosyal sorumluluk ve spor markasına yönelik tutumun; marka farkındalık, algılanan kalite, marka çağrışım düzeylerini artırdığı, algılanan sosyal sorumluluğun marka sadakat düzeyini etkilemediği ortaya çıkmıştır.

**Anahtar Kelimeler:** Spor Giyim Endüstrisi, Marka Denkliği, Kurumsal Sosyal Sorumluluk, Genç Tüketici

**Abstract: Aim:** This study aims to determine the attitudes of the target groups on this issue to investigate the effects of perceived corporate social responsibility on the brand equity of sports brands. The research included 260 students from the Faculty of Sports Sciences at Muğla Sıtkı Koçman University. **Method:** The form, which was applied to students, included demographic information, sports brand attitude scale, and brand equity scale. In the analysis of the data, number, percentage, mean and standard deviation were used as descriptive statistical methods. The t-test was used to compare continuous quantitative data between two independent groups. One-way ANOVA test was used to compare continuous quantitative data between more than two independent groups. The Scheffe test was used as a complementary post-hoc analysis to determine the differences after the Anova test. Pearson correlation and regression analysis were used to analyze the relationship between the continuous variables of the study. **Results:** It was determined that the students' perceived social responsibility averages were weak, the attitudes towards sports brands were moderate, brand awareness, perceived quality and brand association averages were weak, the average of the brand loyalty scores was moderate. There were positive relationships between perceived corporate social responsibility and all dimensions of brand equity. **Conclusion:** According to the results, it was found that attitude towards sports brand and perceived corporate social responsibility increased the level of brand awareness, perceived quality and brand association; perceived social responsibility did not affect the level of brand loyalty.

**Key Words:** Sportswear Industry, Brand Equity, Corporate Social Responsibility, Young Consumer

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- (1) *Sorumlu Yazar, Corresponding Author: Hakan ÜNAL "Doç. Dr. Assoc. Prof", Mugla Sıktı Koçman University, Faculty of Sport Sciences, İstanbul / Turkey, hakan@mu.edu.tr, Geliş Tarihi / Received: 22.12.2019, Kabul Tarihi / Accepted: 15.03.2020, Makalenin Türü: Type of Article: (Araştırma – Uygulama; Research-Application) Çıkar Çatışması, Yok – Conflict of Interest, No, Etik Kurul Raporu veya Kurum İzin Bilgisi- Ethical Board Report or Institutional Approval, No*





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## INTRODUCTION

Corporate social responsibility is one of the most discussed global phenomena that influence organizational performance in different contexts (Sindhu ve Arif, 2017). In a rapidly changing world, businesses endeavor to fulfill their social responsibilities by carrying out various activities that seek to resolve social problems, while also working to create a positive corporate image and brand perception by satisfying the emotional expectations of their consumers (Akkoyunlu ve Kalyoncuoğlu, 2014).

CSR has been defined as a company's commitment to minimizing or eliminating its harmful effects on society and maximizing its long-term beneficial impact (Mohr, Webb and Haris, 2001; Trendafiova, Ziakas and Sparvero, 2017). Recently, with increasing environmental concerns worldwide, the discussion on CSR to incorporate activities that regenerate the quality of our natural environment has rapidly increased. Since the past couple of decades, Corporate Social Responsibility (CSR) has been attracting increasing attention (Huang, Wu, and Gaya, 2017). CSR is particularly important for large brands as it represents a source of competitive advantage (Luo and Bhattacharya, 2006). CSR is known to improve both corporate image and brand image, and it ultimately helps enhance purchase intention (Balmer and Greyser, 2006)

As a significant sector in the world economy, with its broadcasting rights, merchandising and sponsorship agreements, the sports industry has recognized the importance of CSR programmes (Breitbarth ve Harris, 2008; Trendafiova, Ziakas and Sparvero, 2017). Financial reasons, in efforts to maintain legitimacy, and in response to social pressures, sports organizations increasingly engage with corporate social responsibility (Weems et al.,2017).

The philosophy of many sports brands has changed the last few years. Quality, traceability, environmental health, and social responsibility have become more important than ever before. Almost all professional organizations and sports teams began to engage in various forms of corporate social responsibility (CSR) in recent years. This is because CSR can provide financial benefits to increase the public opinion of an organization, increase brand loyalty, and attract potential talent for a firm (Erickson, 2009). Corporate social responsibility (CSR) is an area of great interest, yet little is known about how CSR is perceived and practiced in the professional sports industry (Sheth and Babiak, 2010). Despite the level of CSR-brand integration, the idea is to consider CSR as a consistent part of how the brand behaves. The aim is to understand CSR as an integrative part of a brand and not only as an instrument for improving sales or reputation



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with all the implications and consequences that result from such a strategic shift (Golob and Podnar, 2018). According to Maignan and Ferrell (2001), customers favor companies that have a good corporate image. CSR practices by companies will build a strong corporate reputation, known as intangible assets, and brand equity.

The global sportswear market is highly competitive, and it is one of the most heavily branded areas in the global apparel market (Tong and Hawley, 2009). The sportswear brands are dedicated to create strong brand equity and build brand loyalty by creating a strong and distinctive brand personality. Sportswear brand personality enhances the effectiveness of marketing communications efforts (Su and Tong, 2015). Brand equity (BE) has multiple definitions, which traditionally reflect brands with a commercial lens (Yoo et al. 2000; Naidoo and Abratt, 2018). BE considers the differentiation effect that the customers' knowledge of the brand has on the customers' response to a product or service, the overall utility that customers place in a brand compared to its competitors (Keller 1993; Chekalina et al., 2018).

We must understand the BE as a concept created and maintained in the mind of the consumer, and therefore, to estimate it, it will be necessary to know and to understand the perceptions of the market related to the brands

that, in each case try to compete. (Vilarejo-Ramos and Martin-Velicia, 2007). Perceptual and behavioral components of BE are significant elements of branding and have been extensively discussed in the marketing domain (Keller & Lehmann, 2006; Forudi et al., 2018). Brand equity refers to the value derived from consumer recognition of the overall superiority of a particular brand, which raises a firm's competitive advantage based on brand value propositions besides low price (Lassar *et al.*, 1995). Moreover, the outcome of BE is consumer's purchase intentions (Aaker, 2009). It would not be possible to determine a brand's value without analyzing all elements of which it is composed: the perceived quality, loyalty towards the brand, recognition of the name, and the images associated with the brand (Vilarejo-Ramos and Martin-Velicia, 2007). Prior studies in the branding literature have examined the relationship between specific dimensions of brand equity (e.g., brand trust) and attitudinal or stated measures of behavioral loyalty and have found a strong positive relationship between them (Hariharan et al., 2018).

Aaker (1991) classifies brand equity assets and liabilities into five categories: brand loyalty; name awareness; perceived quality; brand associations; and other proprietary assets (e.g., patents). Keller (1993) distinguishes two significant components of brand



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knowledge (seen as the brand equity differentiator and comparable to brand equity assets and liabilities, as defined by Aaker (1991); brand awareness and brand image. Brand awareness reflects brand node strength in memory and how quickly the brand comes to mind, while brand image reflects types of associations with different levels of abstraction ‘determining the differential response’ to brand equity (Keller, 1993).

Brand awareness in general is a slightly far-reaching and vague term that is impulsively recognized by individuals in most companies. It can be defined as a tool which emphasizes on defining and generating the familiarity and recognisability of a target audience towards a particular brand (Foroudi et al., 2016). Brand image has been defined as “perceptions of the brand that reflect consumer associations in the mind of the consumer” (Keller, 1993). Perceived quality is defined as “the consumer’s judgment about a product’s overall excellence or superiority” (Zeithaml, 1988; Su and Chang, 2018). Keller (2008) defines brand loyalty regarding resonance: that level of customer-brand relationship which depicts sync between the brand and its customers, and which generates peculiar behavioral outcomes such as customers actively seeking means to interact with and share their brand experiences with others. Recent studies argued that brand loyalty is an outcome of

brand equity and confirmed that other brand equity dimensions influence brand loyalty (Buil *et al.*, 2013; Su and Chang, 2018).

While corporate social responsibility (CSR) is an extensively studied phenomenon across management, marketing, and business ethics literature, there still exists a lack of clarity regarding the outcomes associated with investment in CSR.

From a marketing perspective, brand equity (BE) represents the power and reputation that an organization has in the marketplace and ultimately, due to its influence on consumer perceptions and behaviors, will influence a firm’s financial performance (Kim *et al.*, 2003; Rao *et al.*, 2004; Yang and Basile, 2018). Since engaging in CSR is an increasingly common business practice across countries and industries (Seok-Sohn *et al.*, 2012), most fashion companies have conducted CSR even without insights about which CSR activities have more significant influence: at the corporate level or brand level. Therefore, it is necessary to academically study how the implementation of corporate-level or brand-level CSR has a positive effect on the corporate image, brand image, and purchase intention. To explain the increasing purchase intention by corporate-level and brand-level CSR, we employ reciprocity. This study was carried out to investigate the effects of corporate so-

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cial responsibility projects in the sports brand industry on the components of brand equity.

## MATERIAL and METHODS

In this study, the effects of perceived corporate social responsibility and attitude towards sports brands on brand equity were tried to be determined.

### 2.1. Research Group

Having considered that the young generation comprises the significant consumers for sportswear products (Dickson *et al.*, 2004), the target population of this study was defined as university students as young shoppers. The research included 260 students from the Faculty of Sports Sciences at Muğla Sıtkı Koçman University.

### Data Collection Tools

The form included demographic information, brand choices, sports brand attitude scale, and brand equity scale. In this study, the general purpose of CSR and its impact on consumers' brand perception were questioned, thus, in the future CSR activities of the enterprises, the findings related to the general thought of the target groups have been tried to be obtained. The study aims to determine the effectiveness of CSR activities in brand perception and to make extensive evaluations for future studies. For this reason, while creating the model, the brand perception was measured by the elements in the brand equity model of Aaker (1991).

### Model of Research

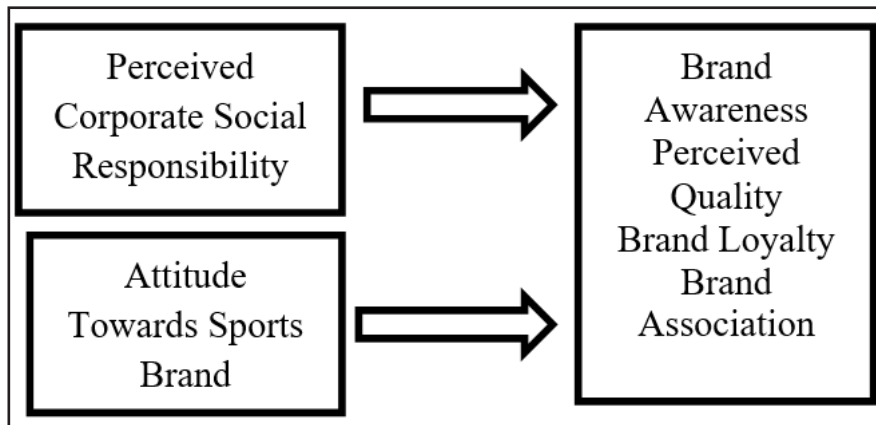


Figure 1. Research Model





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(TRADEMARK)

(2015/04315- 2015-GE-18972)

The hypotheses of this study, which was conducted to determine how the corporate social responsibility and attitude towards sports brand affect brand equity dimensions are as follows:

*H1. Perceived social responsibility activities have impacts on the elements of brand equity.*

H1a: Perceived social responsibility has an impact on brand awareness.

H1b: Perceived social responsibility has an impact on perceived quality.

H1c: Perceived social responsibility has an impact on brand loyalty.

H1d: Perceived social responsibility has an impact on brand association.

*H2. Attitude towards the sports brand has an impact on brand equity.*

H2a. The attitude towards sports brand has an impact on brand awareness.

H2b. The attitude towards sports brand has an impact on perceived quality.

H2c. The attitude towards sports brand has an impact on brand loyalty.

H2d. The attitude towards the sports brand has an impact on brand association.

Consumer-based brand equity model is emphasized, the form was designed by examin-

ing the studies of brand equity of Akkoyunlu and Kalyoncu (2014) and Aaker (1991, 1996) in CSR activities, CSR scale of Sert (2012) and sports brand attitude scale of Arıboğan (2018). The questionnaire form consists of 4 sections: demographic information, sports brand attitude scale, corporate social responsibility scale and brand equity (brand awareness).

### **Data Analysis**

The data were analyzed by using Statistical Package for Social Sciences for Windows 22.0. In the analysis of the data, number, percentage, mean and standard deviation were used as descriptive statistical methods. The t-test was used to compare continuous quantitative data between two independent groups. One-way ANOVA test was used to compare continuous quantitative data between more than two independent groups. The Scheffe test was used as a complementary post-hoc analysis to determine the differences after the Anova test. Pearson correlation and regression analysis were used to analyze the relationship between the continuous variables of the study.

### **Limitations**

In the literature, although there are many studies into Corporate Social Responsibility and Brand Equity which constitute the basic structure of the research, the fact that there



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are few studies overlapping with the subject of the study constitutes a significant limitation. On the other hand, the study included students from Muğla Sitki Kocman University. Also, the study focused on the sports industry; thus, the result of this study may not be universally applied to other industries.

## RESULTS and DISCUSSION

This section contains explanations and comments based on the findings obtained from the analysis of the data collected through the scales.

**Table 1. Perceived Corporate Social Responsibility, Attitudes Towards Sports Brand and Brand Equity Score Means**

	N	Mean	S.D.	Min.	Max.	Alpha
<b>Perceived Corporate Social Responsibility</b>	260	2,178	0,873	1,000	5,000	0,950
<b>Attitudes Towards Sports Brand</b>	260	2,701	0,537	1,000	5,000	0,766
<b>Brand Awareness</b>	260	2,259	0,776	1,000	5,000	0,884
<b>Perceived Quality</b>	260	2,309	0,881	1,000	5,000	0,809
<b>Brand Loyalty</b>	260	2,910	1,024	1,000	5,000	0,739
<b>Brand Association</b>	260	2,415	0,833	1,000	5,000	0,705

It was determined that the students' perceived social responsibility averages were weak  $2,178 \pm 0,873$  (Min=1; Max=5), the attitudes toward sports brands were moderate  $2,701 \pm 0,537$  (Min=1; Max=5), brand awareness was weak  $2,259 \pm 0,776$  (Min=1; Max=5), perceived quality was weak  $2,309 \pm 0,881$  (Min=1; Max=5), and brand association averages were weak  $2,415 \pm 0,833$  (Min=1; Max=5), the average of the brand loyalty scores was moderate  $2,910 \pm 1,024$  (Min=1; Max=5).

Increasing the importance of enterprises on social responsibility leads to an increase in

research on students. There are many studies in the literature measuring social responsibility perceptions of students. In these studies, demographic factors were used as possible explanatory variables. Kraft (1991) investigated the relative importance of work experience in social responsibility perceptions. These researches reveal that social responsibility is considered less important for undergraduate students who act as managers than finance, marketing and human resources students (Kraft, 1991). Gordon (1998) concluded that intensive reading and discussions of students in their classes had a significant





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(2015/04315- 2015-GE-18972)

impact on social responsibility perceptions (Özalp, Tonus, and Sarıkaya, 2008). Özalp, Tonus, and Sarıkaya (2008) examined the students' understanding of the concept and how they learned this concept in order to evaluate the level of perception of their social responsibility. The majority of the students (421 students, 57.7%) reported that they heard the concept but had no detailed information. The work experience of the sample group in our study, the low level of reading and working in the field and the fact that most of them do not work in any job can be associated with the result.

The awareness of a social variable (such as CSR) precedes the development of positive (effective) associations of that variable, and both may influence behavior. In other words, awareness of a specific CSR initiative is a precondition for an individual's beliefs about an organization's social responsibility. Despite this, much of the previous research on CSR implicitly assumed that individuals would naturally be aware of an organization's CSR initiatives if they interacted with an organization at any level. However, research shows that stakeholders often have low awareness of an organization's CSR (Morrison, Misener and Mock, 2018).

**Table 2. The Correlation Analysis Between Perceived Corporate Social Responsibility, Attitude Towards Sports Brand and Brand Equity**

	Perceived Corporate Social Responsibility	Attitudes Towards Sports Brand	Brand Awareness	Perceived Quality	Brand Loyalty	Brand Association
<b>Perceived Corporate Social Responsibility</b>	r 1,000 p 0,000					
<b>Attitudes Towards Sports Brand</b>	r 0,310** p 0,000	1,000				
<b>Brand Awareness</b>	r 0,454** p 0,000	0,306**	1,000			
<b>Perceived Quality</b>	r 0,427** p 0,000	0,327**	0,633**	1,000		
<b>Brand Loyalty</b>	r 0,136* p 0,028	0,213**	0,123*	0,272**	1,000	
<b>Brand Association</b>	r 0,479** p 0,000	0,269**	0,450**	0,502**	0,372**	1,000

\*<0,05; \*\*<0,01

When the correlation analysis between perceived corporate social responsibility, attitude towards sports brand, brand awareness, perceived quality, brand loyalty, brand association were examined, the correlations were as follows:

- Positive among corporate social responsibility and attitude towards sports brand ( $r = 0.31, p = 0.000 < 0.05$ ),
- Positive between brand awareness and perceived corporate social responsibility ( $r = 0.454, p = 0,000 < 0.05$ ),
- Positive between brand awareness and attitude towards sports brand ( $r = 0.306, p = 0.000 < 0.05$ ),
- Positive between perceived quality and perceived corporate social responsibility ( $r = 0.427, p = 0.000 < 0.05$ ),
- Positive between perceived quality and attitude towards sports brand ( $r = 0.327, p = 0.000 < 0.05$ ),
- Positive between brand quality and perceived quality ( $r = 0.633, p = 0.000 < 0.05$ ),
- Positive between brand loyalty and perceived corporate social responsibility ( $r = 0.136, p = 0.028 < 0.05$ ),
- Positive between brand loyalty and sports brand attitude ( $r = 0.213, p = 0.001 < 0.05$ ),
- Positive between brand loyalty and brand awareness ( $r = 0.123, p = 0.047 < 0.05$ ),
- Positive between brand loyalty and perceived quality ( $r = 0.272, p = 0,000 < 0.05$ ),
- Positive between brand association and perceived corporate social responsibility ( $r = 0.479, p = 0.000 < 0.05$ ),
- Positive relationship between brand association and sports brand ( $r = 0.269, p = 0.000 < 0.05$ ),
- Positive among brand awareness and brand awareness ( $r = 0.45, p = 0,000 < 0.05$ ),
- Positive between brand association and perceived quality ( $r = 0.502, p = 0,000 < 0.05$ ),
- Positive between brand association and brand loyalty ( $r = 0.372, p = 0,000 < 0.05$ )

As Deigendesch (2009) argues, ‘brands and corporate social responsibility are two sides of the same coin of entrepreneurial success.’ On the one hand, strategically integrated CSR has a substantial impact on brand image and brand equity. On the other hand, the brand is a result of all that the firm does, regarding



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(2015/04315- 2015-GE-18972)

product offering as well as operating practices and behavior assumed in the competitive environment, especially for value generated for the company and society (Popoli, 2011). It can be asserted that the more fulfilled the consumer expectation, the more valuable the BE. A firm's reputation arising from its ethical behavior is an essential driver of brand valuation (Holt *et al.*, 2004).

In our study, a positive and significant relationship was found between perceived corporate social responsibility, attitude towards sports brand and all components of brand equity. Several marketing studies have found that CSR can positively affect consumers' attitudes towards the firm and its products (Bhattacharya and Sen, 2003; Luo and Bhattacharya, 2006; Mohr *et al.*, 2001).

Lai *et al.* (2010) indicated that buyers' perception of companies' socially responsible activities influenced industrial brand performance and BE. In Koçoğlu (2016) study, according to another result obtained from the effects of the perception of corporate social responsibility on the components of consumer-based brand equity, the respect of the employees from the dimensions of the corporate social responsibility perception ( $\beta = 0,136$ ,  $p = 0,040$ ), the philanthropic activities ( $\beta = 0,246$ , ( $p = 0.001$ ) and consumer respect activities ( $\beta = 0.316$ ,  $p = 0.001$ ) have a positive and significant effect on perceived qual-

ity, which are the components of consumer-based brand equity. Similarly, in the literature, Swaen, and Chumpitaz (2008), Lai *et al.* (2010) support the results of the studies.

Corporate social initiatives strengthen brand image by creating brand awareness. Here, it is aimed to create brand awareness in consumers that the brand is a part of a social campaign rather than creating brand awareness through social initiatives. In the highly competitive sportswear industry, the key is to create a unique, favorable, and strong brand image to provide customers with a reason to buy the brand, then work to keep their loyalty and gain their repeat business (Tong and Hawley 2009). One of the critical variables for the image is the CSR strategy. Businesses with CSR awareness gain significant advantages in providing customer loyalty. Before investing in a company, many investors in the world have now started to evaluate the company's performance in social responsibility (Mohr and Webb, 2001). CSR initiatives help a company to differentiate its product and service by creating a positive brand image, and this safeguards the firm's reputation. This approach makes CSR an integral element in a firm's differentiation strategies and is a form of strategic investment comparable to R&D and advertising (McWilliams *et al.* 2006; Hsu, 2012). The businesses having an awareness of corporate social responsibil-



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International Refereed Academic Journal of Sports, Health and Medical Sciences

January - February - March Issue: 34 Winter Semester Year: 2020

Uluslararası Hakemli Akademik Spor Sağlık ve Tıp Bilimleri Dergisi

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(2015/04315- 2015-GE-18972)

ity will both realize expected social responsibilities by creating brand image taking social issues into account and create brand loyalty by increasing the level of brand awareness and brand association and perceived quality (Koçoğlu, 2017).

In their research Becker-Olsen, Cudmore and Hill found that greater than 80% of respondents believed firms should engage in social initiatives and 76% felt those initiatives would benefit firms (Becker-Olsen et al., 2006). Brand equity is considered as an essential marketing strategy on which business should focus to ensure the trust in the brand,

to perceive the products and services as quality by consumers, to decrease the perceived risk and to ensure brand loyalty with the effect of all these.

According to our results, When the correlation analysis between perceived corporate social responsibility, attitude towards sports brand, brand awareness, perceived quality, brand loyalty, the brand association was examined, positive and significant correlations were found regarding all components. Similarly, these results support the studies of Hoefler & Keller (2002), Polonsky & Jemons (2006), Niazi et al. (2012) in literature.

**Table 3. The Effects of Perceived Corporate Social Responsibility and Attitudes Towards Branding on Brand Equity Elements**

Dependent Variable	Independent variable	$\beta$	t	p	F	Model (p)	R <sup>2</sup>
<b>Brand Awareness</b>	Constant	0,776	3,512	0,001	39,782	0,000	0,230
	Perceived Corporate Social Responsibility	0,353	6,929	0,000			
	Attitude Towards Sports Brand	0,265	3,194	0,002			
<b>Perceived Quality</b>	Constant	0,563	2,228	0,027	37,178	0,000	0,218
	Perceived Corporate Social Responsibility	0,364	6,238	0,000			
	Attitude Towards Sports Brand	0,353	3,729	0,000			
<b>Brand Loyalty</b>	Constant	1,737	5,347	0,000	6,899	0,001	0,044
	Perceived Corporate Social Responsibility	0,090	1,207	0,228			
	Attitude Towards Sports Brand	0,361	2,966	0,003			
<b>Brand Association</b>	Constant	0,949	4,032	0,000	41,855	0,000	0,240
	Perceived Corporate Social Responsibility	0,418	7,689	0,000			
	Attitude Towards Sports Brand	0,206	2,333	0,020			

Regression analysis, which is run to determine the causal relationship between perceived corporate social responsibility, attitude towards sports brand and brand awareness, was found

to be significant ( $F=39,782$ ;  $p=0,000<0.05$ ). Total change in the level of brand awareness is explained by the perceived corporate social responsibility and the attitude towards sports





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January - February - March Issue: 34 Winter Semester Year: 2020

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(TRADEMARK)

(2015/04315-2015-GE-18972)

brand by 23% ( $R^2=0,230$ ). Perceived corporate social responsibility increases

the level of brand awareness ( $\beta=0,353$ ). The attitude towards the sports brand increases the level of brand awareness ( $\beta = 0.265$ ). Attitudes may be measured by asking how much people say they like the brand, feel committed to it, will recommend it to others and have positive beliefs and feelings about it relative to competing brands (Dick and Basu, 1994). True loyalty exists only when the consumer regularly purchases the product or services and displays a strong, positive attitude towards a particular brand (Kaynak, Salman, and Tatoğlu, 2007). Managers should concentrate their efforts primarily on brand loyalty and brand image, which have high importance in the construct of brand equity. In the highly competitive sportswear industry, the key is to create a unique, favorable, and strong brand image to provide customers with a reason to buy the brand, then work to keep their loyalty and gain their repeat business (Aaker, 1991).

Brand awareness creates value in different ways. Brand awareness provides the anchor to which other associations can be linked. Recognition provides the brand with a sense of familiarity and people like the familiar. In the absence of motivation to engage in attribute evaluation, familiarity may be enough. Brand awareness can be a signal of substance.

The first set in the buying process often is to select a group of brands to consider. Brand awareness can be crucial to getting into this group (Aaker 1991). Brand awareness affects consumer decision making by influencing the formation and strength of brand associations in the brand image (Keller 1993).

Brand awareness can be a sign of quality and commitment, letting consumers become familiar with a brand and helping them consider it at the point of purchase (Aaker, 1991). CSR initiatives help a company differentiate its products and services by creating a positive brand image, which maintains the firm's reputation. This approach makes CSR an integral element in a firm's differentiation strategies and is a form of strategic investment comparable to R & D and advertisements (McWilliams et al., 2006). Devinney et al. (2006) contend that the firm should be 'more proactive about consumer social responsibility if they want their corporate social responsibility initiatives to have a greater impact.'

The regression analysis to determine the causal relationship between perceived corporate social responsibility, attitude towards sports brand and perceived quality was found to be significant ( $F=37,178$ ;  $p=0,000<0.05$ ). The total change in the perceived quality level is explained by the perceived corporate social responsibility and the attitude towards the sports brand by 21.8% ( $R^2=0,218$ ). The



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(TRADEMARK)

(2015/04315- 2015-GE-18972)

perceived corporate social responsibility increases the perceived quality level ( $\beta=0,364$ ). The attitude towards sports brand increases the perceived quality level ( $\beta=0,353$ ). Perceived quality is defined as “the consumer’s judgment about a product’s overall excellence or superiority” (Zeithaml, 1988).

It is not the objective quality of the product but consumers’ subjective evaluations which depend on their perceptions. Similar to brand associations, perceived quality also provides value to consumers by providing them with a reason to buy and by differentiating the brand from competing brands (Su and Tong, 2015). Marketers across all product and service categories have increasingly recognized the importance of perceived quality in brand decisions (Morton, 1994). Brand managers should consider the intercorrelations among the four dimensions of brand equity, especially the relationship of perceived quality to brand association and brand loyalty, and the relationship of brand awareness to brand association and brand loyalty. While brand awareness serves as a foundation for brand image and brand loyalty, high quality enables consumers to recognize a brand’s distinctiveness and superiority and leads to consumer satisfaction and loyalty (Aaker, 1991; Oliver, 1997).

Sen and Bhattacharya (2001) found that consumers are sensitive to the implications of

CSR activities and the company’s ability to exceed expectations. Garcia de los Salmo-nes *et al.* (2005), for example, found that consumers’ perception of CSR behavior can have direct consequences in their assessment of the service and perceived service quality (PSQ) (Poolhong and Mandhachitara, 2009). The direct influence of CSR on customer satisfaction was verified by Luo and Bhattacharya (2006). On the other hand, the empirical data and statistical tests in this study did not provide enough support for the positive and direct relationship between perceived quality and brand awareness and brand equity, indicating that having high quality or having a brand name alone is not a guarantee of a successful brand in the sportswear industry. This result is also in line with some earlier studies (Yoo *et al.*, 2000; Tong and Hawley 2009).

Regression analysis to determine the causal relationship between perceived corporate social responsibility, attitudes towards sports brand and brand loyalty was found to be significant ( $F=6,899$ ;  $p=0,001<0.05$ ). The total change in brand loyalty level is estimated at 4.4% by perceived corporate social responsibility and sports brand attitude ( $R^2=0,044$ ). Perceived corporate social responsibility does not affect the level of brand loyalty ( $p=0.228>0.05$ ). The attitude towards the sports brand increases the level of brand loyalty ( $\beta=0,361$ ). Brand loyalty is the core of



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(TRADEMARK)

(2015/04315-2015-GE-18972)

a brand's equity, which signifies a measure of attachment that a customer has to a brand (Aaker, 1991). On the other hand, it can be observed that a consumer who is very loyal to any brand in a product group has a low level of loyalty towards a brand in another product group. In this sense, it is important to identify the differences between loyalty levels that may be valid for different consumers or different brands. The most important reason for this is that each brand loyalty level requires a different marketing effort and should be managed with different marketing staff (Aaker, 1991). The importance and necessity of creating strong brand awareness in creating brand loyalty is an undeniable fact. A strong partnership and trust between consumers and sports products are needed.

Numerous researchers have examined the attitudinal aspect of brand loyalty (Bowen and Shoemaker, 1998; McCleary and Weaver, 1992). According to Jacoby and Chestnut, behavioural loyalty represents the propensity of a consumer to purchase the same brand repeatedly over time (Jacoby and Chestnut, 1978). Attitudinal brand loyalty focuses not only on transactional strategies, such as frequent-user programs and gifts for repeated customers but also on attitudinal variables, such as commitment and trust. Attitudinal studies have described brand loyalty not only as the outcome of repeated purchase behav-

ior but also the consequence of multidimensional attitudes toward a specific brand (Back and Parks, 2003). Unlike many studies, Akkoyunlu and Kalyoncu (2014) concluded that the participants in Turkey were not prone to change their previously used goods and service to support CSR activities because brand loyalty dimension of brand perception is the least affected by CSR.

The regression analysis to find out the causal relationships between perceived corporate social responsibility, the attitude towards sports brand and brand association was found to be significant ( $F=41,855$ ;  $p=0,000<0.05$ ). The total change in the level of brand association is explained by the perceived corporate social responsibility and attitude towards the sports brand by 24% ( $R^2=0,240$ ). Perceived corporate social responsibility increases the level of brand association ( $\beta=0,418$ ). The attitude towards the sports brand increases the level of brand association ( $\beta = 0,206$ ). In their research Tong and Hawley (2009) when the correlation among dimensions was specified in the structural model, the intercorrelations between perceived quality and brand association ( $\gamma=0.52$ ,  $t=5.74$ ) and brand loyalty ( $\gamma=0.52$ ,  $t=6.05$ ), and the intercorrelations between brand awareness and brand association ( $\gamma=0.69$ ,  $t=6.16$ ) and brand loyalty ( $\gamma=0.57$ ,  $t=5.88$ ) were significant and all positive. Thus, perceived quality and brand



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January - February - March Issue: 34 Winter Semester Year: 2020

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(TRADEMARK)

(2015/04315- 2015-GE-18972)

awareness might affect brand equity by influencing brand association and brand loyalty first. Many previous studies also suggested a potential casual order might exist among the brand equity dimensions (Yoo *et al.*, 2000).

Akkoyunlu and Kalyoncu (2014) revealed that the general purpose of CSR activities was to benefit the organization and to promote the corporate image by advertising. According to the analyzes of the brand equity model of Aaker used to measure the brand perception of CSR, It has been concluded that CSR activities affect the brand perception by affecting the factors that make up the brand equity and the brand equity factor that affects the highest rate of CSR activities was brand awareness. The fundamental reason for companies to demonstrate the ability to satisfy CSR expectations in a multidimensional sphere is that the impact of a company's social behavior on brand image is amplified by the very rapid communication flow existing in the inter-stakeholder global context. One of the principal characteristics of globalization is that a large part of popular culture has become a global culture (Holt *et al.*, 2004; Popoli, 2011). In their research Klein and Dawar (2004) CSR appears to influence brand evaluations directly, its impact through attributions appears to be pronounced only for those consumers who report considering a company's CSR as relevant to their decisions. These re-

sults point to important theoretical and managerial implications. Establishing and maintaining a relationship with CSR activities between customers and the company shows that the likelihood of positive results such as CR and BE is higher (Lai *et al.*, 2010 ).

## CONCLUSION

As a result of the statistical analysis performed to test the hypotheses suggested in the study, essential findings were obtained. In the scope of the research, it was determined that the students' perceived social responsibility averages were weak, the attitudes towards sports brands were moderate, brand awareness, perceived quality and brand association averages were weak, the average of the brand loyalty scores was moderate.

There were positive relationships between perceived corporate social responsibility and all dimensions of brand equity. According to the results, it was found that attitude towards sports brand and perceived corporate social responsibility increased the level of brand awareness, perceived quality and brand association; perceived corporate social responsibility did not affect the level of brand loyalty. It was found that it did not affect brand awareness and perceived quality level, that perceived corporate social responsibility did not influence brand loyalty level, and that the





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(TRADEMARK)

(2015/04315-2015-GE-18972)

attitudes towards sports brand increased the brand association level.

Our results support our hypotheses and indicate that perceived social responsibility have positive effects on brand equity. When the correlations between perceived corporate social responsibility, attitudes towards sports brand, brand awareness, perceived quality, brand loyalty and brand association were examined, a significant positive relationship was found between the brand equity dimension.

## RECOMMENDATIONS

CSR is gaining more importance every day in Turkey. Branding and product images are becoming increasingly crucial to Turkish consumers, just as they are to those in Europe and the USA. Increasing the sensitivity of the consumers and the economic level, and purchase preferences increase the images of sports brands that carry out CSR activities. Considering the socio-cultural structure of Turkish consumers, it is known that CSR activities are an essential marketing strategy that adds value to society and provides communication between the society and the enterprise. For brand awareness, perceived quality and brand loyalty to be high, the sports brand industry generally places emphasis on consumer-based brand equity as a whole; in particular, it would be a good practice for

enterprises to develop individual strategies for each component due to the fact that the components of consumer-based brand equity affect each other.

If it is considered that the program was limited research groups and carried out with limited resources, studies with similar content but more consumers may provide more effective results.

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January - February - March Issue: 34 Winter Semester Year: 2020

Uluslararası Hakemli Akademik Spor Sağlık ve Tıp Bilimleri Dergisi

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EVALUATION OF ANTI-TRICHOMONASE ACTIVITIES OF  
METHANOL EXTRACT OF *Hypericum scabrum* L. <sup>(1)</sup>**Hypericum scabrum** L. METHANOL EKSTRAKTININ ANTI-  
TRICHOMONAS AKTİVİTESİNİN DEĞERLENDİRİLMESİ*Necati OZPINAR<sup>1</sup>, Hulya OZPINAR<sup>2</sup>, Nuraniye ERUYGUR<sup>3</sup>, Tuğba KAYA<sup>4</sup>*<sup>1</sup> *Hatay Mustafa Kemal University, Faculty of Health Sciences, Antakya / Turkey*<sup>2</sup> *Sivas Cumhuriyet University, Faculty of Pharmacy, Department of Pharmaceutical Botany, Sivas / Turkey*<sup>3</sup> *Selcuk University, faculty of Pharmacy, Department of Pharmacognosy, Konya / Turkey*<sup>4</sup> *Hatay Mustafa Kemal University, Faculty of Medicine, Department of Parasitology Antakya / Turkey*ORCID ID: 0000-0002-7317-885X<sup>1</sup>, 0000-0001-8154-0874<sup>2</sup>, 0000-0002-4674-7009<sup>3</sup>,  
0000-0001-7612-5414<sup>4</sup>

**Öz: Amaç:** Bu çalışmada, *Hypericum scabrum*'un metronidazole duyarlı ve dirençli *Trichomonas vaginalis*'ler üzerine etkisinin araştırılması amaçlandı. **Yöntem:** *Hypericum scabrum* örnekleri Sivas-Ankara karayolundan toplandı. Toprak üstü kısımları kurutulmuş ve masserasyon yöntemi ile metanol ekstaksiyonu yapıldı. Elde edilen ekstraktlara GC-MS analizi yapılarak olası etken maddeler tespit edildi. *Trichomonas vaginalis* suşarı 5 mg/mL, 2.5 mg/mL, 1.25 mg/mL, 0.6 mg/mL, 0.3 mg/mL, 0.15 mg/mL konsantrasyonlarda bitki ekstraktları ile muamele edildi. **Bulgular:** Metronidazol dirençli *Trichomonas vaginalis* suşalarının Minimum İnhibisyon Konsantrasyonu 2 saatlik bir muamele sonunda 2.5 mg/mL, 4 saatlik muamele sonunda ise 1.25 mg/mL lik konsantrasyonlarda olduğu görüldü. Bu very metronidazole duyarlı suşlarda ise 2 saat sonunda 2.5 mg/mL, 4 saat sonunda ise <0.15 mg/mL olarak tespit edildi. **Sonuç:** *Hypericum scabrum*'un özellikle metronidazole dirençli suşlar üzerindeki etkisi oldukça önemlidir. Bulgularımız bu bitkinin yeni ilaç aktif bileşik izolasyonu için kullanılabileceği düşündürmektedir.

**Anahtar Kelimeler:** *Hypericum Scabrum*, Anti-*Trichomonas* Aktivite, GC-MS

**Abstract: Aim:** The objective of the study to evaluate the methanolic extracts of aerial parts of *Hypericum scabrum* L. for in vitro anti-trichomonase activity. **Methods:** Plant material were collected during the flowering period from natural populations in Sivas province of Turkey. Collected locality is: B6 Sivas: Sivas-Ankara road. The extracts obtained were analyzed by GC-MS to identify possible active substances. *Trichomonas vaginalis* strain was exposed with plant extracts at concentrations of 5 mg / mL, 2.5 mg / mL, 1.25 mg / mL, 0.6 mg / mL, 0.3 mg / mL, 0.15 mg / mL. **Result:** The minimum inhibitory concentration (MIC) was found to be 2.5 mg / mL at the end of 2 hours, 1.25 mg/mL at the end of 4 hours, and 0.6 mg/mL at the end of 24 hours after resistant *T. vaginalis* strains exposed to *H. scabrum* methanol extract. When susceptible strains are to investigated, at the end of 2 hours the MIC value of 2.5 mg/mL is the lowest dose to the study, at 4 hours later even at the concentration of 0.15 mg/mL, no live parasite is found. **Conclusion:** The obtained results suggest that the finding can used to further bio-assay guided active compound isolation from this plant as promising resource.

**Key Words:** *Hypericum Scabrum*, Anti-*Trichomonas* Activity, GC-MS

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## INTRODUCTION

The genus *Hypericum* (Hypericaceae) is represented by more than 400 species throughout the world, is mainly distributed in the Mediterranean and the Near East area (Simpson, 2006:122). In Turkey, *Hypericum* comprises of 96 species, in which half of them are endemic (Guner et al., 2000:2-28; Tekin, 2017:143-152). *Hypericum* species are known for the local name of “sarı kantaron” and “binbir delik out”, have been used for treatment of wound healing, sedative, antiulcer, antidiabetic, antispasmodic and antiseptic in Turkish folk medicine (Bingol et al., 2011:86-90). Phytochemical investigations on Hypericaceae revealed that they contain naphthodiantrones (hypericin and pseudohypericin), acylphloroglucinol derivatives (hyperforin and adhyperforin), flavonoids, tannins, and essential oils (Maggi et al., 2004:702-711; Zorzetto et al., 2015:95-109). The major components in fatty acids of *H. scabrum* L. were  $\alpha$ -linolenic, linoleic and oleic acid (Ozen and Bashan, 2003:723-726). It was reported that  $\alpha$ -Pinene,  $\beta$ -Pinene, spathulenol, *p*-cymene, acetophenone, and carvacrol were the main constituents of the essential oil of *H. scabrum* (Tabanca et al., 2015:62-72). Studies have shown that *Hypericum* species have many biological activities such as antioxidant (Boga et al., 2016:249-257; Mandrone et al., 2015:402-408; Silva et al., 2005:157-167), antimicrobial (Boga et

al., 2016:249-257), cytotoxicity (Tala et al., 2015:149-155) and enzyme inhibition activity (Mandrone et al., 2015:402-408). In spite of many biological activity study on *Hypericum* species, there was little study on *H. scabrum* L.

Trichomoniasis is a most common protozoan infectious disease of the urogenital tract of humans caused by *Trichomonas vaginalis* (*T. vaginalis*), which is the reason why the rate of illness is high in women who have reached sexual maturity. *T. vaginalis*, an anaerobic protozoan that causes trichomoniasis in humans, moves by itself with a whip and waving membrane. Trichomonal infection has a cosmopolitan distribution and is detected in all racial groups and socioeconomic layers. Approximately 333 million new Sexually Transmitted Diseases (STDs) occur annually in the world, of which 170 million are *T. vaginalis* infections (WHO, 2012). Metronidazole is the only drug for therapy of this disease approved by FDA. However, metronidazole has been reported for the resistance by *T. vaginalis* (Kirkcaldy et al., 2012:939; Schwebke and Barrientes, 2006:4209-4210; Snipes et al., 2000:3004-3009).

The aim of the present study focuses on the investigation of anti-*Trichomonase* activity of *H. scabrum* methanol extract.



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## MATERIAL and METHODS

GC-MS analysis was performed by GRUM-LAB (Giresun University Center Research Laboratory, Application and Research Center)

### *Plant Materials*

Plant material were collected during the flowering period from natural populations in Sivas province of Turkey. Collected locality is: B6 Sivas: Sivas-Ankara road, 25 km.

### *Preparation of the Extracts*

The dried plant materials were powdered using a grinder. The extraction was done at room temperature. 10 g of dried and grounded herbs were extracted with methanol (250 mL×4) for 24 h with intermittent shaking. Then mixture were filtered through a filter paper (Whatman, No.1). The filtrates combined together and concentrated under vacuum on a rotary evaporator (Buchi R-100 equipped with Vacuum Pump V-300 and Control unit I-300) at 40°C and stored at -20°C for further processing. The yields of crude methanol extracts of *H. scabrum* was obtained as 18.9 %.

### *Anti-Trichomonase Vaginalis Activity*

The metronidazole-resistant *T. vaginalis* ATCC 50143 and the metronidazole-sensitive strain, *T. vaginalis* ATCC50148 strain

(obtained by American Type Culture Collection (ATCC) were used in this study.

### *Culture of Trichomonase Vaginalis*

Trichomonas Broth (TB, liofilchem, 610061) medium was purchased commercially and was prepared according to the manufacturer's instructions. After preparation of the TB, it was distributed among the experimental tubes and placed in the autoclave at 121°C for 15 mins, then cooled to 37°C, and 10% inactive horse serum (Sigma, 1234598765) was added to the medium. The *T. vaginalis* strains were added to the TB medium and incubated for 3 days at 37°C under anaerobic conditions.

### *In Vitro Anti-Trichomonase Assay*

The Minimum Lethal Dose (MLD) of the metronidazole-sensitive strain, *T. vaginalis* ATCC50148, and the metronidazole-resistant strain, *T. vaginalis* ATCC50143 against metronidazole was tested in comparison with the plant extract. For this purpose, 96-well plates were used. The *T. vaginalis* strains produced from seeding in the TB medium at 37°C were incubated in metronidazole (Sigma, 1711544348111) concentrations of 400 µM, 200 µM, 100 µM, 50 µM, 25 µM, 12,5 µM, 0,6 µM and 0,3 µM. and plant extract concentration 5 mg/mL, 2.5 mg/mL, 1.25 mg/mL, 0.6 mg/mL, 0.3 mg/mL, 0.15 mg/mL After 2-4-24 h, the incubated live protozoa were checked on a Thoma slide for flagellated and



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(2015/04315- 2015-GE-18972)

undulating membrane movement and were counted in a 1% eosin solution. A dose where no live parasites were found was determined microscopically and evaluated as MLD.

## RESULTS

### *Chemical Composition by GC-MS Analysis*

The chemical compositions of methanol extract of *Hypericum scabrum* aerial parts have

been determined by GC-MS (Table 1). The methanol extract was found to have a higher component content. While the most abundant components are palmitic acid (8.78 %), benzoic acid (2.97%), and -1-carbaldehyde (2.01%) for methanol extract (Table 1). Among the compounds, the 4H-Pyran-4-one are important for the biosynthesis of the hypericin that are main compound of *Hypericum* species.

**Table 1. Chemical Compositions of Methanol Extracts of *Hypericum scabrum***

Components	RT	Methanol (%)
Ethanone	14.268	0.65
Benzoic acid	15.212	2.97
4H-Pyran-4-one	17.054	1.37
Isopropyl phenyl ketone	27.542	1.74
Naphthalene	28.435	0.27
Dodecanoic acid	30.867	0.36
Spathulenol	31.147	0.33
Hexadecanoic acid	37.773	0.90
Palmitic acid	38.792	8.78
Furo[2,3-b]quinolin-4(9H)-one	40.091	1.28
4,1-herbertenolide	40.354	0.46
9-Octadecenoic acid	40.600	0.79
9,12-Octadecadienoic acid	41.527	1.70
(1RS,2SR)-2-methyl-2'-methylpen-1-carbaldehyde	42.116	2.01
trans-Geranylgeraniol	43.587	0.73
Tetracosane	46.093	0.65
Geranyl-linalol	46.242	0.78
Octadecane	49.137	0.28
Ent-beyer-15-en-18-ol	57.383	1.25

#### *Anti-Trichomonase vaginalis activity*

The effect of *H. scabrum* methanol extract on metronidazole susceptible and resistant *T. vaginalis* strains is shown in Table 2. The minimum inhibitory concentration (MIC) was found to be 2.5 mg/mL at the end of 2 hours, 1.25 mg/mL at the end of 4 hours, and 0.6

mg/mL at the end of 24 hours after resistant *T. vaginalis* strains exposed to *H. scabrum* methanol extract. When susceptible strains are to investigated, at the end of 2 hours the MIC value of 2.5 mg/mL is the lowest dose to the study, at 4 hours later even at the concentration of 0.15 mg/mL, no live parasite is found (Table 2).

**Table 2. The Viable Counts of *T. Vaginalis* Isolates Exposed to Different Concentrations of Metronidazole at the End of 2, 4 and 24 Hours**

TV strains		Metronidazol Concentration								
		400 $\mu$ M	200 $\mu$ M	100 $\mu$ M	50 $\mu$ M	25 $\mu$ M	12.5 $\mu$ M	0.6 $\mu$ M	0.3 $\mu$ M	Control
N1	2 h	14.10 <sup>3</sup>	14.10 <sup>3</sup>	14.10 <sup>3</sup>	15.10 <sup>3</sup>	17.10 <sup>3</sup>	18.10 <sup>3</sup>	18.10 <sup>3</sup>	18.10 <sup>3</sup>	18.10 <sup>3</sup>
N2		0	0	0	0	0	6.10 <sup>3</sup>	8.10 <sup>3</sup>	12.10 <sup>3</sup>	17.10 <sup>3</sup>
N1	4 h	14.10 <sup>3</sup>	14.10 <sup>3</sup>	14.10 <sup>3</sup>	15.10 <sup>3</sup>	17.10 <sup>3</sup>	18.10 <sup>3</sup>	18.10 <sup>3</sup>	18.10 <sup>3</sup>	18.10 <sup>3</sup>
N2		0	0	0	0	0	0	6.10 <sup>3</sup>	10.10 <sup>3</sup>	18.10 <sup>3</sup>
N1	24 h	14.10 <sup>3</sup>	16.10 <sup>3</sup>	16.10 <sup>3</sup>	18.10 <sup>3</sup>	18.10 <sup>3</sup>	20.10 <sup>3</sup>	20.10 <sup>3</sup>	20.10 <sup>3</sup>	20.10 <sup>3</sup>
N2		0	0	0	0	0	0	0	12.10 <sup>3</sup>	22.10 <sup>3</sup>

TV strains		<i>H. scabrum</i> methanol extract concentration							Control
		5 mg/mL	2.5 mg/mL	1.25 mg/mL	0.6 mg/mL	0.3 mg/mL	0.15 mg/mL		
N1	2 h	0	0	2.10 <sup>3</sup>	4.10 <sup>3</sup>	10.10 <sup>3</sup>	10.10 <sup>3</sup>	18.10 <sup>3</sup>	
N2		0	0	1.10 <sup>3</sup>	2.10 <sup>3</sup>	5.10 <sup>3</sup>	12.10 <sup>3</sup>	17.10 <sup>3</sup>	
N1	4 h	0	0	0	2.10 <sup>3</sup>	3.10 <sup>3</sup>	7.10 <sup>3</sup>	18.10 <sup>3</sup>	
N2		0	0	0	0	0	0	18.10 <sup>3</sup>	
N1	24 h	0	0	0	0	2.10 <sup>3</sup>	7.10 <sup>3</sup>	20.10 <sup>3</sup>	
N2		0	0	0	0	0	0	22.10 <sup>3</sup>	

TV; *Trichomonas vaginalis*, N1; *T. vaginalis* ATCC50143 Resistance to Metronidazol, N2; *T. vaginalis* ATCC50148 Sensitive to Metronidazol.

## DISCUSSION

The *T. vaginalis* is a sexually transmissible protozoan parasite and common all over the world and is found in every continent and climate and It is the commonest curable sexually transmitted infection. The prevalence of

infection varies according to the way of living and socio-cultural structure of the society. The frequency of *T. vaginalis* infection in men is not well defined, because it is usually asymptomatic and the source of continuous infection are asymptomatic men (Petrin et al., 1998:300-317).

In recent studies, this parasite has become more important as it has been found to increase the transmission rate of HIV (Polat et al., 2011:35-68).





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In studies in Turkey, 5-10% in healthy women who went to private clinics *T. vaginalis* was detected. In addition, 13-25% of women admitted to the gynecology and obstetrics clinic and 50-70% of women working in brothels and women's prisons were detected (Culha et al., 2006:16-18).

Metronidazole-containing preparations are often used in the treatment of trichomoniasis. However, recently metranidazole has failed in some patients when not combined with another antibiotic, and in some patients the recurrence of the disease after a short time suggests two things. The first is that the disease is not caused by *T. vaginalis*. The second is that *T. vaginalis* has developed resistance to its medication like many living things. Although resistance studies are not sufficient, such studies have been encountered in recent years.

According to studies in the United States, metronidazole resistant *T. vaginalis* has been reported at rates varying between 4.3% and 9.6% (Kirkcaldy et al., 2012:939). In another study in Finland, 10 clinical isolates were tested positive for metronidazole resistance of these, 3 (30,0%) resistant strains were identified (Meri et al., 2000:763-767). In a 2018 study in Turkey, metronidazole resistance was tested using conventional and molecular methods and resistant isolates were

determined at a rate of 33.3% (Ozcelik et al., 2018:188-194).

*Hypericum scabrum* is widely used in alternative medicine. However, we have not found any study on the antiprotozoal effect of *Hypericum scabrum* on *T. vaginalis* in literature. In our study, the effect of *Hypericum scabrum* on metronidazole resistant *T. vaginalis* strains is of great importance.

## CONCLUSION

It is important to underline the fact that this is the first report about the anti-*T. vaginalis* activity on *Hypericum scabrum* methanol extract. The obtained results suggest that the finding can be used to further bio-assay guided active compound isolation from this plant as a promising resource.

## Conflict of interest

The authors declare that there is no conflict of interest.

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ANALYSIS OF NUTRITION INFORMATION OF ATHLETES  
COMPETING IN INTERCOLLEGIATE WRESTLING TURKEY  
CHAMPIONSHIP (1)ÜNİVERSİTELERARASI GÜREŞ TÜRKİYE ŞAMPİYONASINDA  
YARIŞAN SPORCULARIN BESLENME BİLGİLERİNİN ANALİZİHayrettin GÜMÜŞDAĞ<sup>1</sup>, Alpaslan KARTAL<sup>2</sup>, Erol BAYKAN<sup>3</sup><sup>1-2-3</sup>Yozgat Bozok University, School of Physical Education and Sports, Yozgat / TurkeyORCID ID: 0000-0002-1616-8671<sup>1</sup>, 0000-0003-1567-6276<sup>2</sup>, 0000-0002-7429-3446<sup>3</sup>

**Öz: Amaç:** Araştırma da çeşitli üniversitelerde aktif olarak güreş sporuyla uğraşan bayan ve erkek güreşçilerin beslenme bilgi düzeylerini karşılaştırmak, gelir düzeyi ve beslenme konusunda eğitim alıp almadığının güreşçilerin beslenme bilgi düzeylerine etkisi incelenmiştir. Araştırmaya 11 bayan 44 erkek olmak üzere aktif güreş sporuyla uğraşan 55 kişi gönüllü olarak katılmıştır. **Yöntem:** Demografik özelliklerine ilişkin bulgular ile bunların yorumlarına yer verilmiştir. Verilerde kayıp gözeler bulunmaktadır. Bu değerler kayıp veri olduğundan cevapsız olarak değerlendirilmiştir. Araştırmaya göre; Gelir durumları ile değişkenler (besin maddeleri, tüm değişkenler) arasında ANOVA test istatistiği sonucuna göre Gelir durumları arasında fark bulunmamıştır. H0 hipotezi kabul edilmiştir (besin maddeleri için  $F=0,509$ ;  $p=0,604>0,05$  – tüm değişkenler için  $F=0,094$ ;  $p=0,910>0,05$ ). Gelir durumları arasında fark bulunmadığından post hoc analizi yapılmamıştır. Diğer değişkenler (sıvı maddeler, yenileme, kilo kontrolü, gıda takviyeleri) normal dağılımından Kruskal Wallis testi yapılmıştır. Yapılan test sonuçlarına göre p değerleri 0,05 ten büyük olduğundan gelir durumu ile sıvı maddeler, yenileme, kilo kontrolü, gıda takviyeleri arasında farklı olmadığı bulunmuştur. **Bulgular:** Beslenme konusunda eğitimlerde yapılan bağımsız T testi sonrasında beslenme konusunda eğitim ile besin maddeleri ve tüm maddeler arasında farklı olmadığı bulunmuştur. Yani H0 hipotezi ret edilmiştir (besin maddeleri için  $t=0,022$ ;  $p=0,983>0,05$  – tüm maddeler için  $t=0,730$ ;  $p=0,470>0,05$ ). Diğer değişkenler (sıvı maddeler, yenileme, kilo kontrolü, gıda takviyeleri) normal dağılımından Mann Whitney U testi yapılmıştır. Yapılan test sonuçlarına göre p değerleri 0,05'ten büyük olduğundan beslenme eğitimi ile sıvı maddeler, yenileme, kilo kontrolü, gıda takviyeleri arasında farklı olmadığı bulunmuştur. Kadın ve erkeklerin, karşılaştırması için yapılan bağımsız T testi sonrasında cinsiyet ile besin maddeleri ve tüm maddeler arasında farklı olduğu bulunmuştur. Yani H0 hipotezi ret edilmiştir (besin maddeleri için  $t=-2,198$ ;  $p=0,032<0,05$  – tüm maddeler için  $t=-2,294$ ;  $p=0,026<0,05$ ). Ortalama değerlere bakıldığında erkekler kızlara göre daha fazla olduğu söylenebilir. Diğer değişkenler (sıvı maddeler, yenileme, kilo kontrolü, gıda takviyeleri) normal dağılımından Mann Whitney U testi yapılmıştır. Yapılan test sonuçlarına göre p değerleri 0,05 ten büyük olduğundan cinsiyet ile sıvı maddeler, yenileme, kilo kontrolü, gıda takviyeleri arasında farklı olmadığı bulunmuştur. **Sonuç:** Araştırmanın sonucuna göre; beslenme eğitimi alanlarla almayanlar arasında fark olmadığı için beslenme eğitimlerinin periyodik aralıklarla sporculara verilmesi uygun olabilir. Gelir durumunun beslenme bilgi düzeyi ile alakalı olmadığı anlaşılmıştır. Cinsiyet ile besin maddeleri ve tüm maddeler arasında fark olduğu, sıvı maddeler, yenileme, kilo kontrolü, gıda takviyeleri arasında fark olmadığı ortaya çıkmıştır.

**Anahtar Kelimeler:** Güreş, Beslenme, Yarışma, Analiz

**Abstract: Aim:** The study examined the nutritional information levels of female and male wrestlers actively engaged in wrestling at various universities, and the effect of income level and nutrition education on the nutritional information levels of wrestlers. 55 people who experienced active wrestling, including 11 women and 44 men, participated in the research as volunteers. **Method:** demographic characteristics of the findings and their interpretations are given. There are missing eyes in the data. These values have been evaluated as missed because they are lost data. According to the study, there was no difference between income states and variables (nutrients, all variables) according to the ANOVA test statistic. The H0 hypothesis has been accepted ( $F=0.509$  for nutrients;  $p=0.604>0.05$  –  $F=0.094$  for all variables;  $p=0.910>0.05$ ). Post hoc analysis was not performed because there was no difference between income states. The Kruskal Wallis test was performed because other variables (liquids, replenishment, weight control, food supplements) were not normally distributed. According to the results of the test, p values are greater than 0.05 and it was found that there is no difference between income status and liquid substances, renewal, weight control and food supplements. **Results:** after the Independent T test conducted in nutrition education, it was found that there was no difference between nutrition education and nutrients and all substances. So the H0 hypothesis has not been rejected ( $t=0.022$  for nutrients;  $p=0.983>0.05$  –  $t=0.730$  for all ingredients;  $p=0.470>0.05$ ). Since other variables (liquids, replenishment, weight control, food supplements) were not normally distributed, the Mann Whitney U test was performed. According to the results of the test, p values are greater than 0.05 and it was found that there was no difference between nutrition education and liquid substances, refreshment, weight control and food supplements. Women and men were found to be different between sex and nutrients and all ingredients after the Independent t test for comparison. So the H0 hypothesis has been rejected ( $t=-2.198$  for nutrients;  $p=0.032<0.05$  –  $t=-2.294$  for all ingredients;  $p=0.026<0.05$ ). Men are more likely than girls when looking at average values. Since other variables (liquids, replenishment, weight control, food supplements) were not normally distributed, the Mann Whitney U test was performed. According to the results of the test, p values are greater than 0.05 and it was found that there was no difference between sex and liquid substances, renewal, weight control and food supplements. **Conclusion:** as there is no difference between those who receive nutrition training and those who do not receive nutrition training, it may be appropriate to give nutrition training to athletes at periodic intervals. It was understood that income status was not relevant to the level of nutritional information. It has been revealed that there is a difference between sex and nutrients and all ingredients, there is no difference between liquid ingredients, refreshment, weight control, food supplements.

**Key Words:** Wrestling, Nutrition, Competition, Analysis

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## INTRODUCTION

Since nutrition in sports affects both the general health and the sporting performance of the athlete, it is now better understood that it is a subject to be focused on carefully and it has started to be focused on.

What is inevitable for every living thing is to ensure that physiological activities are carried out normally in the process from birth to death. It is seen that adequate and balanced nutrition also plays an important role in maintaining a healthy and high quality life of the individual. Our country has health problems in both developed and developing countries. The nutritional status of the people varies according to regions, seasons, socioeconomic level, rural-urban separation. One of the most important reasons for inadequate and unbalanced nutrition is lack of nutritional knowledge. Nutritional information is one of the factors affecting the nutritional status and habits of individuals, families and societies. Therefore, the place and importance of nutrition education in the protection and development of Health is great (Şanlıer, Konaklıoğlu, Güver, 2009).

Sports performance can be negatively affected by an unbalanced diet, as can be improved by a balanced diet. Athletes spend most of their time training in order to increase their efficiency, but also ignore the advantages that can

be achieved with a good diet. Indeed, great efforts are made to train and proper nutrition is of great importance in order not to frustrate these efforts (Şemşek, 2001).

Nutrition: to meet the energy needs of the vital activities in our body, protect our health, physical growth and development to make it possible to practice and adapt your workout to maximize the effects of essential nutrients; carbohydrates, fats, proteins, vitamins, minerals and water can be defined as consuming a balanced diet (Bully, 2001). To know the feeding habits of adolescents and to determine their relationship with economic, socio-demographic factors and health are guiding in understanding the causes and consequences of eating habits (Tanrıverdi et al., 2011).

Athlete nutrition: according to the sex of the athlete, age, daily physical activities and the type of sport he does, training and competition periods by making arrangements for food intake in an adequate and balanced manner (Güneş, 2009). A good diet alone is not enough for a good yield. However, in a poor diet the yield level drops. In this respect, athletes should recognize their own food and their needs they should know (Sun and Ersoy.1997). In addition, the rate of injury in athletes is as high as 50% with good nutrition it is also stated that it can be reduced (Gülgün 2004).





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Wrestling: it is a fighting sport in which two people combine their body and intelligence to give each other the upper hand. It is the struggle of two wrestlers or people to establish superiority by using their technique, skill, strength and intelligence in accordance with the rules of "FILA" without using tools on certain sizes of mattresses (Şahin, 2005). Wrestling is a dual combat sport. Each wrestler tries to bring his opponent on his back or defeat him with points. It is not enough for him to have only good technique and condition, on the contrary, he must have the tactical ability to attack and defend in every case of wrestling with courage (Blacksmith, 1995). Wrestling is defined as the struggle of two wrestlers or people to establish superiority over each other by using their technique, skill, strength and intelligence in accordance with FILA rules without using a tool on a certain size cushion (Gökdemir, 2000). Turkish wrestling started its official structure with the establishment of the Republic in 1923; Turkish Wrestling Federation was established on 13 April 1923; it became a member of Fila and participated in the Olympics held in Paris in 1924 for the first time (Avcı oğlu, 1993).

Today, wrestling is important as a close combat sport, which requires the joint work of all body parts, as well as courage, reflex, skill, endurance and strength, which requires star-

ting preparations at an early age (Kürkçü ve Özdağ, 2005).

## MATERIAL and METHOD

### Research Group

The sample of the study consisted of athletes who are currently actively engaged in the sport of wrestling, participating in the Intercollegiate Turkish Championship held on April 25-30, 2017 in Sivas province. There are 55 wrestlers in total, of which 11 are female students and 44 are male students.

### Data Collection Tools

Measuring the nutritional information levels of the wrestlers participating in the survey a team of experts consisting of 6 sports dieticians, adapted to Turkish, administered the athlete nutrition information level determination questionnaire. Sports Nutrition Questionnaire (Zinn, schofield and wall, 2005) 23 substances were applied to participants in the Scale: 7 from nutrients, 5 from liquids, 5 from regeneration, 2 from weight gain, 2 from weight loss (4 under weight control) and 2 from food supplements. The correct answers given by the athletes are 1, the wrong answers are -1, and the undecided or not sure answers are 0. IBM-SPSS 22.0 program has been entered.



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## Analysis of the Data

During the data acquisition phase of the research, the athlete nutrition information level determination scale survey consisting of 23 items was applied to the athletes who participated in the inter-university wrestling championship held in Sivas province. In the statistical analysis, nutritional information levels were examined according to the variables of gender, income level and whether or not to receive training in nutrition. The IBM-SPSS 22.0 program was used to analyze the data and create the tables. In Analyses; by using descriptive statistical techniques, Kolmogorov-Smirnov test, it was determined whether or not the nutritional information score was normal distribution according to the variables. In cases where the normality assumption is provided, the Independent T test was used to compare two independent groups and the one-way variance analysis was used to compare more than two groups. The Mann Whitney U test and Kruskal Wallis test analyses were used in groups three and above. The level of significance was evaluated as 0.05.

## Hypotheses

H0: there is no difference between gender and variables (nutrients, liquids, replenishment, weight control, food supplements, all variables).

H1: there is a difference between gender and variables (nutrients, liquids, replenishment, weight control, food supplements, all variables).

H0: there is no difference between income states and variables (nutrients, liquids, replenishment, weight control, food supplements, all variables).

H1: there is a difference between income states and variables (nutrients, liquids, replenishment, weight control, food supplements, all variables).

H0: there is no difference between training and variables (nutrients, liquids, replenishment, weight control, food supplements, all variables).

H1: there is a difference between training and variables (nutrients, liquids, replenishment, weight control, food supplements, all variables).

## FINDINGS

Held at Taha Akgül Gymnasium in Sivas province on April 25-30, 2017 is still actively participating in intercollegiate gym championship in the sport of wrestling that they took the level of income of the people who made nutrition and nutrition education on nutrition knowledge level of male and female athletes and compare the effect of 6 dietitians to determine the level of knowledge and sports





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nutrition knowledge of athletes prepared by an expert team to determine the level of the scale adapted to Turkish was applied. Sports Nutrition Questionnaire (Zinn, schofield and wall, 2005).

In this section, the findings and interpretations of their demographics are given. There are missing eyes in the data. These values were evaluated as lost data and were not answered.

**Table 1. Descriptive Statistics On Demographic Variables**

		Number	% Percentage
<b>Gender</b>	Woman	11	20,0
	Man	44	80,0
<b>Age</b>	18	4	7,3
	19	12	21,8
	20	12	21,8
	21	9	16,4
	22	6	10,9
	23	6	10,9
	24	3	5,5
	25	1	1,8
	26	1	1,8
	27	1	1,8
<b>Income</b>	2000 and Under	16	29,1
	2001-3000	16	29,1
	3001-4000	10	18,2
	4001-5000	6	10,9
	5001 and Over	7	12,7
<b>National Player</b>	Yes	43	78,2
	No	12	21,8
<b>NUTRITION BEFORE HAVE YOU TRAINED ABOUT?</b>	Yes	24	43,6
	No	31	56,4

As the table shows, of the 55 participants, 11 (20%) were girls and 44 (80%) were boys. Of the 55 respondents, 16 (29.1%) were 2000

and below, 16 (29.1%) were 2001-3000, 10 (18.2%) were 3001-4000, 6 (10.9%) were 4001-5000, and 7 (12.7%) were 5001 and

over. According to the income situation, the largest group is those in the group 2000 and below and 2001-3000, while the smallest group is those in the group 5001 and above. All of the participants are wrestlers. Of the participants, 43 people (78.2%) were national athletes and 12 people (21.8%) were not national athletes. 24 people (43.6%) of the athletes had previously been trained in nutrition. 31 people (56.4%) declared that they had not been trained in nutrition before.

If a test scale measures the desired property correctly and without mixing it with other properties, this test is said to be valid. Reliability affects the validity of a test. A valid test must be reliable. The first condition for a measurement tool to be considered valid is that it is reliable (Alpar, 2010). The alpha coefficient scale calculated to measure reliability states that if 0.40 to 0.60 it is "low reliable", if 0.60 to 0.80 it is "highly reliable" and if 0.80 to 1.00 it is "highly reliable". When we examine the reliability of substances,

## NUTRIENTS

1. A high carbohydrate diet reduces the destruction of protein in the body.
2. After eating, drinking tea prevents iron intake from foods.
3. Spinach and chard plants are essential for our bodies in terms of iron supply.

4. The increase in the amount of vitamin C in our body prevents iron absorption.
5. The amount of protein in a glass of whole milk is greater than the amount of protein in a glass of skimmed milk.
6. The amount of calcium in a glass of whole milk is greater than the amount of calcium in a glass of skimmed milk.
7. Calcium is most easily obtained from Yersil leaf vegetables.
8. If a person wants to lose weight, they should choose to eat boiled potatoes instead of eating french fries.

As a result of the analysis carried out on the data, a reliability value of the scale's internal consistency cronbach alpha coefficient as low as  $\alpha = 0.414$  was obtained.

## LIQUID SUBSTANCES

1. A fluid loss of 2% of our body weight lowers our performance by 20%.
2. Weighing players before and after competitions is a good way to determine the fluid requirement of individuals.
3. The best time for an athlete to perform fluid intake during exercise is when he or she is thirsty.
4. Fruit juice should be consumed during training and between competitions.

5. Energy drinks such as” Monster “and” Red Bull “ should be consumed 30 minutes before training.

As a result of the analysis carried out on the data, a reliability value of the scale’s internal consistency cronbach alpha coefficient as low as  $\alpha = 0.067$  was obtained.

### WEIGHT GAIN and WEIGHT LOSS

1. To increase lean muscle mass, it is necessary to eat protein-weighted novelties.
2. It is necessary to use protein powder to increase lean novelties.
3. If an athlete continues his / her training program without ever changing and drinks 6 cups of juice in addition to his / her normal diet, he / she is likely to gain weight.
4. Instead of 1 teaspoon of margarine on the sandwich bread 1 teaspoon of butter should apply.
5. He should eat more cheddar cheese instead of lean mozzarella cheese.
6. He should eat a small amount of salami and a lot of chicken breasts.
7. He should not eat pasta and rice after 17:00 in the evening.

8. To get more protein, he should eat muesli bars and dried fruit instead of eating yogurt.

As a result of the analysis carried out on the data, a reliability value of the scale’s internal consistency cronbach alpha coefficient as low as  $\alpha = 0.155$  was obtained.

### FOOD SUPPLEMENTS

1. Creatine supplements are very beneficial for athletes who want to get their strength up to the top.
2. The effect of creatine use is quite effective when the body’s energy stores are depleted.
3. Creatine has a performance-enhancing effect, as well as a fat increase in body metabolism.
4. Creatine is very useful for improving performance in endurance exercises.
5. Multivitamin tablets should be used by athletes.
6. Athletes should use the iron tablet when they feel too tired and exhausted.
7. Vitamin C promoters should be used regularly by athletes.
8. Vitamin B should be used when energy drop is felt.



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January - February - March Issue: 34 Winter Semester Year: 2020

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(2015/04315- 2015-GE-18972)

Ninth Protein powder helps to burn fat in the body during exercise.

10. Salt tablets should be used by athletes to prevent cramps that may occur during exercise.

11. The athlete should use thermogenic tablets (L-carnitin) if the goal is to lose weight.

As a result of the analysis carried out on the data, a reliability value of the scale's internal

consistency cronbach alpha coefficient as low as  $\alpha = 0.417$  was obtained.

### TEST of NORMALITY

Normality analysis has been performed to measure whether our data is normally distributed. Normality analysis was studied with Kolmogorov-Smirnov test statistic. Since nutrients ( $p=0.077$ ) are all substances ( $p=0.098$ ), our data is normally distributed. It is not normally distributed for other scoring (Total Food, Liquids, Recovery, Weight Control, Food Sup.).

**Table 2. Normality Test**

	Kolmogorov-Smirnov <sup>a</sup>		
	Statistics	df	Sig.
# Food Ingredients	,113	55	<b>,077</b>
# Liquids	,159	55	,001
# Replenishment	,186	55	,001
# Weight Control	,148	55	,004
# Food Supplement	,136	55	,013
Cumulative	,109	55	<b>,098</b>



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**Table 3. Skewness and flatness values (Descriptive Statistics)**

	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
# Food Ingredients	-,102	,322	,319	,634
# Liquids	-,128	,322	-,739	,634
# Replenishment	,681	,322	,224	,634
# Weight Control	,780	,322	-,214	,634
# Food Supplements	,406	,322	,674	,634
Cumulative	,983	,322	2,438	,634
Valid N (listwise)				

## EVALUATION of FINDINGS

**Table 4. Percentage of Right, Wrong, Undecided and Unanswered Percentage of Respondents Given to Survey Questions**

	% Percentage			
	True	Wrong	Unstable	No Answer
Food Ingredients	%48,5	%11,5	%38,2	%1,8
Liquids	%37,2	%9,1	%53,5	%0,2
Replenishment	%25,1	%0,8	%32,4	%41,7
Weight Control	%31,5	%8,1	%36,5	%23,9
Food Supplement	%37,9	%19,0	%42,5	%0,6



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ID:475 K:459

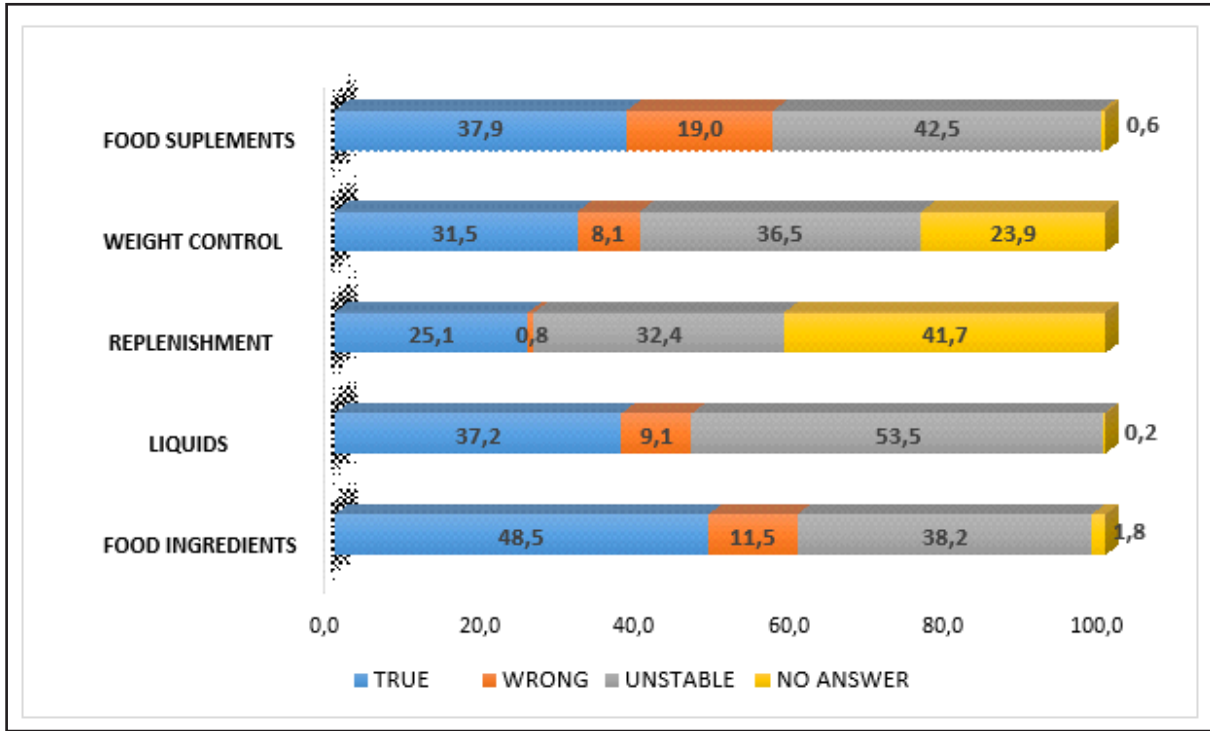
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(2015/04315- 2015-GE-18972)

**Table 5. Graphical Representation of the Percentage of Right, Wrong, Undecided and Unanswered Percentage Given by the Participants to the Survey Questions**



**Table 6. Mean Percentages and Standard Deviations of the Questions That the Participants Gave Right, Wrong, Undecided and Unanswered Questions**

	AVERAGE - STANDARD DEVIATION			
	TRUE	WRONG	UNSTABLE	NO ANSWER
Food Ingredients	20,4±5,1	4,8±5,4	16±4,3	0,7±1,1
Liquids	3,3±1,5	0,8±1,2	4,8±1,7	-
Replenishment	2,8±1,7	0,1±0,4	3,6±1,8	4,6±2,1
Weight Control	4,7±2,5	1,2±1,5	5,5±2,2	3,6±2,1
Food Supplements	4,2±2,1	2,1±2,8	4,7±2,4	0,1±0,3



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**Analysis on the basis of variables according to sex (nutrients, liquids, refreshments, weight control, food supplements, all variables) :**

Since the data is normally distributed (as can be understood from the normality test table, TOPBM and TOTALLAM  $p > 0.05$ ), Independent t test was performed. The Independent t test for independent groups is a statistical analysis method used to test whether the averages belonging to the two groups are different from each other. The Independent t

test examined whether there was a difference between sex and variables (nutrients and all variables).

H0: there is no difference between gender and variables (nutrients, liquids, replenishment, weight control, food supplements, all variables).

H1: there is a difference between gender and variables (nutrients, liquids, replenishment, weight control, food supplements, all variables).

**Table 7. Descriptive Statistical Table About Gender**

	GENDER	N	Mean	Standard Deviation	Standard Error Mean.
# FOOD ING.	WOMAN	11	17,27	5,042	1,52
	MAN	44	21,02	5,065	0,764
CUMULATIVE	WOMAN	11	30,73	5,424	1,635
	MAN	44	36,77	8,277	1,248

**Table 8. Homogeneity Test of Variances**

	Levene's Test		t-test						
	F	Sig.	t	df	Sig. (2-tailed)	Average Differences	Standard Error Differences	95% Confidence Int.	
								Lower	Upper
#FOOD Varians equal	,061	<b>,806</b>	<b>-2,198</b>	53	<b>,032</b>	-3,750	1,706	-7,171	-,329
Varians not equal			-2,204	15,453	,043	-3,750	1,701	-7,367	-,133
CUM. Varians equal	1,188	<b>,281</b>	<b>-2,294</b>	53	<b>,026</b>	-6,045	2,636	-11,332	-,759
Varians not equal			-2,939	23,204	,007	-6,045	2,057	-10,299	-1,792

The first table is the descriptive statistics table. In other words, it is the table that shows how many people are in which group and the mean and standard deviation of each group. The average for nutrients was 17.27 for girls and 21.02 for boys.

The F value in the first part of the Independent t test table is used to test whether the variances are homogeneous(Levene test). Right next to you, Sig. if the value is less than 0.05, the variance is not homogeneous(p=0.806 ; p=0.281). Sig next to f. if the value is greater than 0.05, it is decided that the variances are homogeneous. Women and men were found to be different between Sex and nutrients and

all ingredients after the Independent t test for comparison of Nutritional Information levels. So the H0 hypothesis has been rejected (t= -2.198 for nutrients ; p=0.032<0.05 – t= -2.294 for all ingredients ; p=0.026<0.05). When looking at average values it can be said that boys are more than girls. Since other variables(liquids, replenishment, weight control, food supplements) were not normally distributed, the Mann Whitney U test was used. According to the results of the test, p values are greater than 0.05 and it was found that there was no difference between sex and liquid substances, renewal, weight control and food supplements.

**Table 9. Mann Whitney U Test (Hypothesis Test Summary)**

	Null Hypothesis	Test	Sig.	Decision
1	The Distribution of # Liquid and Gender	Indepentent-Samples Mann-Whitneu U Test	.691	Retain the null hypothesis
2	The Distribution of # Recovery and Gender	Indepentent-Samples Mann-Whitneu U Test	.242	Retain the null hypothesis
3	The Distribution of # Weight Control and Gender	Indepentent-Samples Mann-Whitneu U Test	.151	Retain the null hypothesis
4	The Distribution of # Food Suplement and Gender	Indepentent-Samples Mann-Whitneu U Test	.536	Retain the null hypothesis

Asymptotic significances are displayed. The significance level is ,05

**Variables (nutrients, liquids, regeneration, weight control, food supplements, all variables) analysis by income status:**

**Table 10. ANOVA Income Test**

	Number	%	Cumulativ %
2000 and Lower	16	29,1	29,1
2001-3000	16	29,1	58,2
3001 and Upper	23	41,8	100,0
Total	55	100,0	

In order to give statistically significant results in the analyses, data of 3000 and above were combined in the case of income.

One-way variance analysis (Anova) is used to calculate the difference between three and more independent averages in a normal distribution data. Anova alone compares the arithmetic averages of three or more groups; when

at least one of these comparisons is meaningful, the Anova result is also meaningful. The test investigated whether income states differed according to variables (nutrients, liquids, replenishment, weight control, food supplements, all variables). The homogeneity of the variances was tested with Levene test statistic and ANOVA test statistic was performed.



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(TRADEMARK)

(2015/04315- 2015-GE-18972)

H0: there is no difference between income states and variables (nutrients, liquids, repl-

nishment, weight control, food supplements, all variables).

**Table 11. Homogeneity Test of Variances**

	Levene Stat.	df1	df2	Sig.
# FOOD INGREDIENTS	,325	2	52	,724
CUMULATIVE	1,395	2	52	,257

The homogeneity of the variances was tested with the Levene test statistic. since  $p > 0.05$ , the variances are homogeneous.

**Table 12. ANOVA**

		Total Squares	Degree of Freedom	Mean	F	Sig.
# FOOD	Between groups	28,453	2	14,226	<b>,509</b>	<b>,604</b>
	In-group	1452,457	52	27,932		
	Total	1480,909	54			
CUMULATIVE	Between groups	12,840	2	6,420	<b>,094</b>	<b>,910</b>
	In-group	3548,688	52	68,244		
	Total	3561,527	54			

There was no difference between income states and variables (nutrients, all variables) according to the ANOVA test statistic. The H0 hypothesis has been accepted ( $F=0.509$  for nutrients;  $p=0.604 > 0.05$  –  $F=0.094$  for the sum of all substances;  $p=0.910 > 0.05$ ). Post

hoc analysis was not performed because there was no difference between income states.

The Kruskal Wallis test was performed because other variables (liquids, replenishment, weight control, food supplements) were not normally distributed.



**Table 13. Kruskal Wallis**

	# Weight			
	# Liquid	# Replenishment	Control	# Food Supplements
Chi-Square	,425	,488	,004	,279
df	2	2	2	2
Asymp. Sig.	,809	,783	,998	,870

According to the results of the test, p values are greater than 0.05 and it was found that there is no difference between income status and liquid substances, renewal, weight control and food supplements.

**Analysis on the basis of variables (nutrients, liquids, refreshments, weight control, food supplements, all variables) according to educational status in nutrition:**

H0: there is no difference between training and variables (nutrients, liquids, replenishment, weight control, food supplements, all variables).

H1: there is a difference between training and variables (nutrients, liquids, replenishment, weight control, food supplements, all variables).

**Table 14. Independent t Test**

HAVE YOU EVER BEEN EDUCATION ABOUT NUTRITION?		N	Mean	Standard Deviation	Standard Error Average
# FOOD	YES	24	20,29	6,868	1,402
	NO	31	20,26	3,633	0,652
CUM.	YES	24	36,54	10,476	2,138
	NO	31	34,81	5,764	1,035

The F value in the first part of the Independent t test table is used to test whether the variances are homogeneous(Levene test). Right next to you, Sig. if the value is less than 0.05, the variances are not homogeneous(p=0.001 ; p=0.009). After an Independent t test, it was

found that there was no difference between nutrients and all ingredients by training. So the H0 hypothesis has not been rejected (for nutrients t=0.022 ; p=0.983>0.05 – the sum of all substances t=0.730; p=0.470>0.05).

Since other variables (liquids, replenishment, weight control, food supplements) were not

normally distributed, the Mann Whitney U test was performed.

**Table 16. Mann Whitney U test (Hypothesis Test Summary)**

	Null Hypothesis	Test	Sig.	Decision
1	The Distribution of # Liquid and Nutrition Question	Independent-Samples Mann-Whitney U Test	.671	Retain the null hypothesis
2	The Distribution of # Recovery and Nutrition Question	Independent-Samples Mann-Whitney U Test	.197	Retain the null hypothesis
3	The Distribution of # Weight Control and Nutrition Question	Independent-Samples Mann-Whitney U Test	.514	Retain the null hypothesis
4	The Distribution of # Liquid and Nutrition Question	Independent-Samples Mann-Whitney U Test	.085	Retain the null hypothesis

Asymptotic significances are displayed. The significance level is ,05

According to the results of the test, p values are greater than 0.05 and it was found that there was no difference between nutrition education and liquid substances, renewal, weight control and food supplements.

## DISCUSSION and CONCLUSION

The main objective of this research is to compare nutrition information levels of female and male wrestlers participating in the Interuniversity Wrestling Championship held in Sivas province on April 25-30, 2017, and to examine the effect of income level and nutrition education on nutrition information levels of wrestlers.

According to the results of the research, it is understood that income status is not related

to nutritional information level. It was revealed that there was a difference between sex and nutrients and all ingredients (thought to be more common in men), there was no difference between liquids, refreshments, weight control, and food supplements. With training on nutrition, it was found that nutrients are not different from liquid ingredients, refreshment, weight control, food supplements, and not all ingredients.

As a result of research (Gümüşdağ and Kartal; 2019), it was determined that judoists had sufficient knowledge about nutrition. However, the level of nutrition knowledge can be further increased by directing athletes to nutrition training. Referees are seen to be affected by ads in preference to vitamins, whi-



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le some people sometimes take ads into account. The majority of people are safe about the reliability of the illegally sold vitamins it seems that they are not, and 19. we can show the substance as evidence for that substance. In line with these results determined within the scope of the research, it was concluded that the vast majority of football referees do not use vitamins. But some referees seem to use vitamins. It is also observed that the sensitivity of referees on health-related issues is similar in all quarters. The referees think that they have sufficient knowledge about vitamins and act in favour of vitamin use in case of health problems. (Gümüldağ and Kartal; 2019).

As a result, it is thought that it will be useful to inform wrestlers who are trained at the university about their nutritional knowledge, which significantly affects performance and success. Research has shown that a significant proportion of athletes do not have sufficient knowledge of athlete nutrition, and some are erroneous found to have eating habits, family and coaches active in the training of athletes they were determined to be. It was therefore concluded that it would be beneficial for athletes and their families and coaches to be informed about athlete nutrition.

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SEROPREVALANCE OF *Toxoplasma gondii* INFECTION AMONG  
PSYCHIATRIC DISEASES <sup>(1)</sup>PSİKIYATRİK HASTALARDA *Toxoplasma gondii* SEROPREVALANSI

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**Öz: Amaç:** Bu çalışmada psikiyatrik hasta gruplarında *Toxoplasma gondii* seroprevalansının araştırılması amaçlandı. **Metot:** Sivas Cumhuriyet Üniversitesi Sağlık Uygulama ve Araştırma Hastanesi psikiyatri polikliniğine başvuran hasta gruplarında *Toxoplasma gondii* seroprevalansının belirlenmesi için, ELISA yöntemi ile anti-*Toxoplasma gondii*-IgG ve anti-*Toxoplasma gondii*-IgM antikorlarının varlığı araştırıldı. Çalışmada 18-80 yaş arası, 175 psikiyatrik hasta (65 şizofreni hastası, 46 Depresyon ve 64 Bipolar Affektif Bozukluk(BAD)) ve aynı yaş grubundaki 100 sağlıklı bireyler kontrol grubu olarak belirlendi. **Bulgular:** *Toxoplasma gondii* IgG antikorları 65 şizofreni hastasının 33'ünde (% 50.76), 46 depresyon hastasının 24'ünde (% 52.17) ve 64 BAD hastasının 30'unda (% 46.87) pozitif bulundu. Bu oran kontrol grubunda 25 (% 25) olarak belirlendi. *Toxoplasma gondii* IgM antikorları şizofreni tanılı 65 hastanın 4'ünde (% 6.15) ve BAD hastalarının 5'inde (% 7.81) bulundu. 46 depresyon hastasında toksoplazma IgM antikorları bulunmadı. Bu oran kontrol grubunda 1 (% 1) olarak belirlendi. **Sonuç:** Şizofreni ve bipolar bozukluğu olan hastalarda *Toxoplasma gondii* enfeksiyonu prevalansı kontrol grubuna göre anlamlı derecede yüksek bulundu. Psikiyatrik bozukluklarda anti-*Toxoplasma gondii* antikorlarının ölçümü, hastalığın değerlendirilmesine ve tedavinin zamanında başlatılmasına olanak tanımaktadır. *Toxoplasma gondii* enfeksiyonunun, psikiyatrik bozukluğu olan hastalarda risk faktörü oluşturabileceği sonucuna varılmıştır.

**Anahtar Kelimeler:** T. Gondii; Psikiyatrik Hastalıklar; ELISA

**Abstract: Aim;** This study aims to investigate the seroprevalence of *Toxoplasma gondii* in psychiatric patient groups. **Methods:** To define anti- *Toxoplasma gondii* IgG and anti- *Toxoplasma gondii* IgM antibodies seropositivity and determine the seroprevalence of toxoplasmosis in patients presenting at the Psychiatry outpatient clinic of Healthcare Application and Research Hospital, Sivas Cumhuriyet University were use ELISA method. 175 psychiatric patients (65 patients with schizophrenia, 46 Depression and 64 Bipolar Affective Disorder) aged from 18-80 years old and samples from 100 the same age range healthy individuals as a control group. **Results:** Anti-*Toxoplasma gondii* IgG antibody was found positive in 33 (50.76%) of 65 schizophrenia patients, in 24 (52.17%) of 46 depression patients and 30 (46.87%) of 64 BAD patients. This rate was determined as 25 (25%) in the control group. anti-*Toxoplasma gondii* IgM antibody was found in 4 (6.15%) of 65 patients with schizophrenia and 5 (7.81%) of BAD patients. anti-*Toxoplasma gondii* IgM antibody was not found in 46 depression patients. This rate was determined as 1 (1%) in the control group. **Conclusions:** The prevalence of *Toxoplasma gondii* infection in patients with schizophrenia and bipolar disorder was significantly higher compared to the control group. Measurement of anti-*Toxoplasma* antibodies in psychiatric disorders enables the evaluation of the disease and the timely initiation of treatment. It was concluded that *Toxoplasma gondii* infection may be a risk factor in patients with psychiatric disorders.

**Key Words:** T. Gondii; Psychiatric Disorders; Seroprevalance; ELISA

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## INTRODUCTION

The protozoan parasite *Toxoplasma gondii* (*T. gondii*) is widely distributed throughout the world. It is in Phylum Apicomplexa, and its life cycle can only be completed in cats that are definitive hosts. However, *T. gondii* also infects a wide variety of intermediate hosts, including humans (Sharif et al., 2015:1-16). Latent toxoplasmosis, commonly seen in immunocompetent individuals, until recently was believed to be asymptomatic as a result of a balance between the immune system and the parasite (Walochnik et al., 2017:177-189). In addition, various neurological symptoms, such as incoordination, head-shaking, tremors, and seizures, recently have been described in monkeys, sheep, pigs, cattle, rabbits infected with *T. gondii* (Torrey et al., 2003:1375).

Recent epidemiologic studies indicate that infectious agents may contribute to some cases of schizophrenia (Celik et al., 2015:015; Torrey et al, 2006:729-736; Yolken et al, 2017: e0006040). In animals, infection with *T. gondii* can change the behavior and neurotransmitter function. In humans, acute infection with *T. gondii* may produce psychotic symptoms similar to those seen in schizophrenia patients (Torrey et al., 2003:1375).

*Toxoplasma* parasites have also been shown to impair learning and memory in mice and

to produce behavioral changes in both mice and rats (Aiello et al., 1998:143-156). Of particular interest are studies showing that *Toxoplasma*-infected rats become less neophobic, leading to the diminution of their natural aversion to the odor of cats (Mandarino, 1992:1892-1901). These behavioral changes increase the chances that a cat will eat the rat, thus enabling *Toxoplasma* to complete its life cycle, an example of evolutionarily driven manipulation of host behavior by the parasite (Berday et al, 2000:1591-1594; Torrey, 2003:1375; Witting et al., 1979:29-51).

In Sivas, the second largest province in Turkey by territory, that located mainly at the eastern part of the Central Anatolia region of Turkey, there is no data about seropositive of *T. gondii* infection in patients suffering from psychiatric diseases, and there is no information about risk factors increasing the seroprevalence of *T. gondii* in patients with psychiatric diseases. The successful identification of blood-based antibody markers for latent infections including *Toxoplasma* would represent an advance in the prediction and prevention of psychiatric diseases and their complications in this population. After considering these thoughts about the relationship of *T. gondii* and psychiatric diseases, we thought that a study investigating the seroprevalence of *T. gondii* and psychiatric diseases could make a considerable contribution to the screening and diagnosis



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and follow-up of psychiatric disorders. The present study aimed to investigate the seroprevalence of *Toxoplasma* in clinically well-characterized samples of psychiatric patients.

## MATERIALS and METHODS

### Methods

This cross-sectional study was performed on psychiatric patients referred to Psychiatry outpatient clinic of Healthcare Application and Research Hospital. All patients who were referred to the psychiatry center and would like to contribute in our study were questioned about demographic characteristics, abortion, the habit of feeding cats and consumption of raw or undercooked meat. All patients and healthy individuals who gave written consent were recruited in this study using the convenience sampling method.

The study included the samples from 175 psychiatric patients (65 patients with schizophrenia, 46 Depression and 64 Bipolar Affective Disorder (BAD)) aged from 18-80 years old and samples from 100 the same age range healthy individuals as a control group. A blood sample of 2-3 ml was taken from patients aged. The blood sample was centrifuged at 1500 rpm for 10 mins for separation of the serum. The serum samples were stored at -20°C until assay. The Toxo-IgG and Toxo-IgM antibodies were investigated in the test serums with the enzyme-linked immunosor-

bent assay (ELISA) using Dia Pro (Milan, Italy) commercial kits with 100% sensitivity and 100% specificity. The ELISA was performed and evaluated according to the Dia Pro (Milan, Italy) kits procedure. Absorbance plate wells were read at a wavelength of 450 nm with a plate reader (Labomed EMR-500, USA).

### Statistical Analysis

The row data was entered and analyzed by the SPSS v22.0 statistics program. In the evaluation of the data, as the parametric test assumptions were not met, Fisher's Exact test was used. A value of  $p < 0.05$  was accepted as statistically significant.

## RESULTS

Serum samples collected from 175 psychiatric patients (65 patients with schizophrenia, 46 Depression and 64 BAD) were examined for *T. gondii* antibodies with the ELISA method. The results were compared with those of serum samples collected from 100 healthy individuals.

*Toxoplasma* IgG antibodies were found to be positive with the ELISA method in 87 (49.7%) of the 175 psychiatric patients. This rate was determined as 25% in the control group. There was a significant difference between the groups ( $p < 0.05$ ). *Toxoplasma* IgG antibodies were found positive in 33 (50.76%) of

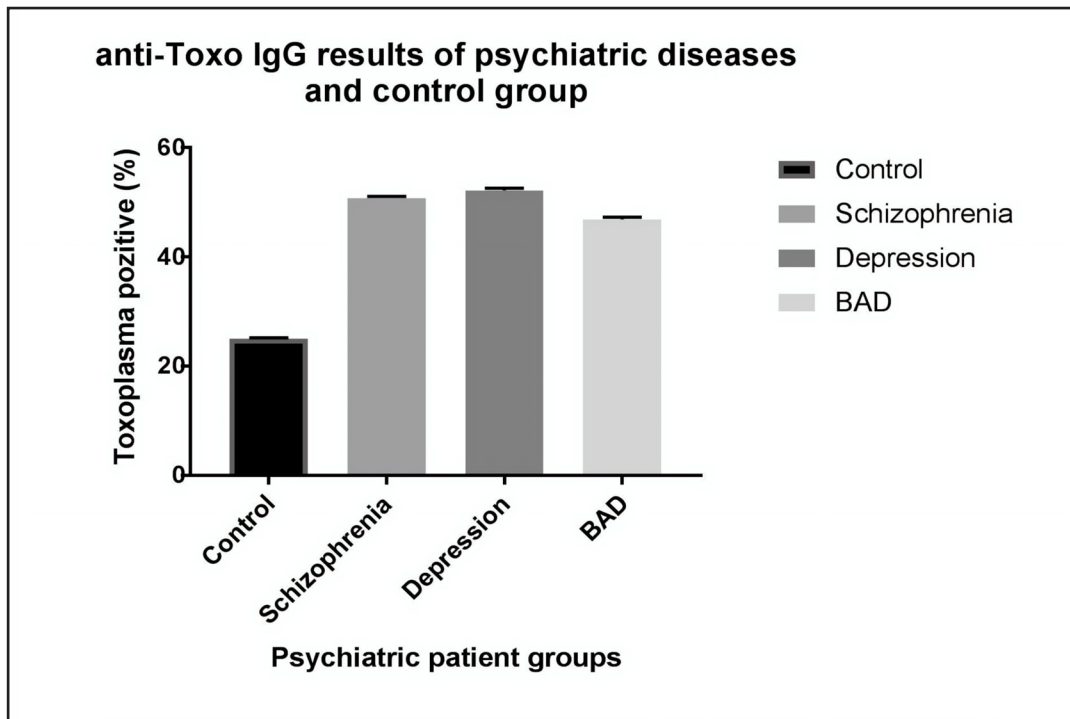
65 schizophrenia patients, in 24 (52.17%) of 46 depression patients and 30 (46.87%) of 64 BAD patients. When the patient groups were

compared with the control group, the difference was found to be statistically significant. ( $p < 0.05$ , Table 1, Figure 1).

**Table 1. Distribution of the anti-Toxo IgG and IgM Positive Results of the Psychiatric Disorders and Control Groups**

	Controls (n = 100)	Schizophrenia (n = 65)	Depression (n = 46)	BAD (n = 64)
IgG	25 (25%)	33 (50.76%)	24 (52.17%)	30 (46.87%)
IgM	1 (1%)	4 (6.15%)	0	5 (7.81%)
IgG + IgM	0	2 (3.07%)	0	3 (4.68%)

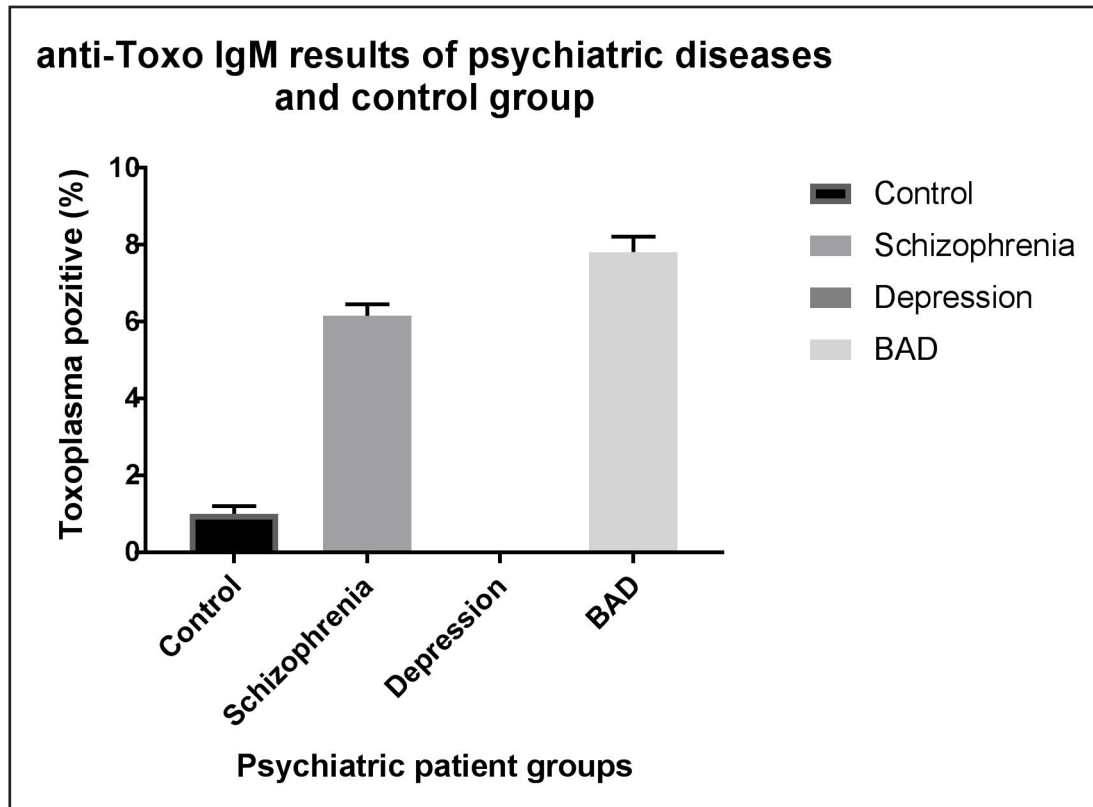
Fisher's Exact,  $p=0.014$ , BAD: Bipolar Affective Disorder



**Figure 1. Anti-Toxo IgG Results of Psychiatric Diseases and Control Group (BAD: Bipolar Affective Disorder)**

*Toxoplasma* IgM antibody positivity was determined in 10 (5.7%) patients of the patient group and only 1 of the control group. There was a significant difference between the groups ( $p < 0.05$ ). *Toxoplasma* IgM antibodies were found in 4 (6.15%) of 65 patients with schizophrenia and 5 (7.81%) of BAD patients. *Toxoplasma* IgM antibodies were not found in 46 depression patients. When the patient groups were compared with the con-

trol group, the difference between the patients with depression was insignificant, while the difference between schizophrenia and BAD patients was significant ( $p < 0.05$ , Table 1, Figure 2). Also, *Toxoplasma* IgG antibodies and *Toxoplasma* IgM antibodies were found positive in 5 patients. Of these, 2 (3.07%) had schizophrenia, and 3 (4.68%) had BAD (Table 1).



**Figure 2. anti-Toxo IgM Results of Psychiatric Diseases and Control Group (BAD: Bipolar Affective Disorder)**



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## DISCUSSION

The seropositivity of toxoplasmosis varies between 5-90% worldwide. The prevalence of toxoplasmosis in our country is reported to vary between 12-65%. (Boluk et al., 2012:137-141). It is known that toxoplasmosis is an important cause of abortion and stillbirths in many mammalian species and selectively infects muscle and brain tissue. It has been shown that *Toxoplasma* disrupts learning and memory in mice and causes behavioral changes in both mice and rats. Rats normally escape cat odor, but studies are showing that rats infected with *Toxoplasma* do not escape cat odor (Berdoy et al., 2000:1591-1594; Witting, 1979:29-51). Under normal conditions, mice and rats, which the intermediate host of the parasite, are expected to stay away from that area, by fearing the smell of cat urine. In their brains, infected rodents carrying the tissue cyst of the parasite have been observed to show a behavioral change in the direction of not being afraid of cats. This causes cats to hunt more easily. It has been shown that the natural and learned fear reactions against cat urine not only decreased in infected rodents but also perceived the smell as a pheromone and increased their interest in sex. These behavioral changes increase the likelihood that the mouse will be eaten by a cat, thus allowing *Toxoplasma* to complete its life cycle.

As in other intermediate hosts, *Toxoplasma* parasites in humans may also form tissue cysts in many organs, including the brain. It was previously thought that *Toxoplasma* did not cause any symptoms in the immune component host. However, recent studies have interaction *Toxoplasma* with many neuropsychiatric disorders such as schizophrenia (Torrey et al, 2003:1375, 2017:247-252), BAD (Hamdani et al., 2013:444-448), suicide behavior (Zhang et al., 2012:1069-1076), anxiety disorder (Markovitz et al., 2015:192-197).

In a study, a group of 2052 patients with 1481 psychiatric disorders and 571 healthy controls was formed, and the *Toxoplasma* relationship with psychiatric disorders was tested. As a result of this study, *Toxoplasma* prevalence was not found to have a significant prevalence in patients with psychiatric disorders other than schizophrenia and psychosis (Yolken et al., 2017: e0006040). In our study, 33 (50.76%) of 65 schizophrenia patients, 24 (52.17%) of 46 depression patients and 30 (46.87%) of 64 BAD patients were positive for *Toxoplasma* IgG antibodies, and the difference was significant compared to control group composed of healthy individuals.

When *Toxoplasma* IgM seropositivity examined, was found to be positive for *Toxoplasma* IgM antibodies in 4 (6.15%) of 65 schizophrenia patients and 5 (7.81%) of 64





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BAD patients. *Toxoplasma* IgM antibodies were not found in 46 depression patients.

When the data were compared with the control group, the difference between the control group and the patients with depression was insignificant. However, the difference between schizophrenia and BAD patients and the control group was significant. According to these results, 87 (49.7%) of 175 psychiatric patients had *Toxoplasma* infection before, and 10 (5.7%) patients were still undergoing *Toxoplasma* infection.

*T. gondii*, which can lead to fetal destruction and abortus with the transplacental transmission, is reported to be a risk factor in the development of many neuropsychiatric diseases. In many studies, it is known that the tachyzoites entering the host body can spread to all the organs of the body in the acute phase, but prefer the brain, eye and heart muscle. It is thought the immune system activated by the entry of the parasite into the body, consequently release of neurotransmitters and changes in intracellular Ca<sup>2+</sup> may affect the electrical activity of the cell. As a result, changes can be made in the cognitive and psychological state of the host (Ayaz et al, 2016:90-95).

In conclusion, the prevalence of *T. gondii* infection in patients with schizophrenia and bipolar disorder was significantly higher com-

pared to the control group. For this reason, *T. gondii* infection should be considered as a high-risk factor associated with psychiatric disorder. Measurement of anti-*Toxoplasma* antibodies in psychiatric disorders may help evaluate the disease and timely initiating treatment.

### **Ethics Approval**

The present study was conducted according to the principles of the Declaration of Helsinki. Approval for this study was granted by the Clinical Research Ethics Committee of Cumhuriyet University with decision no. 2018-06/08, dated 06.26.2018.

### **Conflict of Interest**

The authors declare no conflict of interest.

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## DERGİ HAKKINDA

Dergimiz 2011 yılında yayın hayatına başlamıştır. Başta spor bilimleri olmak koşulu ile sağlık bilimleri ve spor bilimlerinin ortak kabul ettiği alandan yayınlar kabul edilmektedir. Günümüz koşullarında teknolojinin getirdiği kolaylık ve bilimsel çalışmalara duyulan ihtiyaç nedeni ile dergimiz bu anlamda duyulan eksikliği bir nebze olmak koşulu ile gidermeye çalışmak amacıyla yayın hayatına girmiştir. Dergimiz başta spor bilimleri, spor eğitimi, sporcu sağlığı, sağlık yönetimi, spor hekimliği, tıp tarihi ve etik, sporcu beslenmesi, spor psikolojisi, spora yönelik tıbbi ve biyolojik bilimler “doping” gibi bilim dallarından yayın kabul etmektedir. Ayrıca bu ana bilim anabilim dallarının alt bilim dallarında yapılan çalışmaları kendi alanında uzman hakemlerin değerlendirmesi ve olumlu sonuç alan çalışmaların yayını kabul etmektedir. Farmakoloji bilimi içerisinde yer alan fakat sporcu ve sporcu sağlığına yönelik çalışmalar da yine dergimizde kabul edilip değerlendirmeye alınmaktadır. Spor ve sporculara yönelik adli bilimler alanında yapılan çalışmalar da yine dergimiz bünyesinde kabul edilerek değerlendirmeye alınmaktadır. Gerçek anlamda bilimsel nitelik taşıyan, bilim dünyasına bilimsel anlamda hizmet edecek ve katkı sağlayacak çalışmalar ve bu çalışmalara ilişkin araştırma, derleme ve çeviri içerikli yayınları dergimiz kabul etmekte olup bünyesinde yayınlamaktadır.

Dergimiz yılda dört sayı çıkarmakta olup her bir sayı yılın üç ayında bir basılı olarak yayınlanmaktadır. Dergimiz çalışma prensibi doğrultusunda her alana ait çalışmaya eşit ve adil şekilde yer vermektedir. Dergimize gelen çalışmalar iki ayrı alan uzmanı hakem tarafından değerlendirilmekte olup bu değerlendirme süresi hakemlerin iş yoğunluğu kapsamında iki aylık süreci kapsamaktadır. İki ayrı hakemden onay alan çalışmalar dergimizin yayın kurulu onayı ile sıraya alınarak basılı şekilde yayınlanmaktadır. Dergimizde yazım kuralları apa sistemine göre düzenlenmekte olup, örnek bir makale formatı sistemden indirilmek koşulu ile yazarlar tarafından kullanılabilir. Editör makamı derginin her türlü sisteminden sorumlu olup, hiçbir hakem ve yazar yükümlülüğünü taşımamaktadır. Yazarlar kendi hür irade ve bilgileri doğrultusunda yayın yapma hakkına sahip olup yayına kabul edilip yayınlanan çalışmalar konusunda bütün yükümlülüğü kabul etmiş bulunmaktadır. Dergimiz yayıncı ve okuyucu arasında bir köprü vazifesi yüklenmiştir. Dergimiz ve yayınlar hakkında değerlendirme yapan hakemler yayınlanan yayın hakkında hukuki bir yükümlülüğe sahip değildir. Her türlü yükümlülük yazarlara aittir. Dergimiz hiçbir yayın hakkında hakemler üzerinde etki ve zorlayıcı bir yaptırıma sahip değildir. Hiçbir çalışma bir başka çalışmaya karşı öncelik hakkına sahip değildir. Her bir çalışma kendi açısından aynı koşul ve şartlara tabidir. Bir öncelik ve ayrıcalığı bulunmamaktadır. Hiçbir yazar değerlendirme yapan hakem hakkında bilgi sahibi olamaz ve hakemler üzerinde yüküm-

lülük oluşturamaz. Dergi yönetimi ve editör hiçbir çalışmanın öncelikli olduğunu belirleyemez ve hiçbir yazara öncelik veremez. Sistem her çalışma ve her yazar için aynı koşul ve şartlarda işletilir. Dergimizin yazım dili İngilizce'dir.

Dergimiz uluslararası nitelikte olup bu niteliklere sahip çalışmaları kabul eder. Bir başka dergiye herhangi bir nedenle gönderilmiş çalışmalar dergimizde yayınlanmak amacıyla kabul edilse bile tekzip yayınlanmak koşulu ile red edilir. Dergimize gönderilen her bir çalışmanın hakkı yazar tarafından dergimize verilmiştir. Yazar bunu peşinen kabul etmiştir. Bu durum ve koşullar; yayın dergimizin sistemine yüklendiğinde işletilmeye başlanır. Bunun için yazarlardan özel bir beyan ve imza alınmaz. Oluşan veya oluşabilecek hukuki sorunlarda dergimizin hukuk danışmanları dergimiz ve dergimiz hakemlerini korumak adına her türlü işlemi tek taraflı olarak yapma hakkına sahiptir.

T.C. Üniversitelerarası Kurul Başkanlığı, Sağlık Bilimleri Temel Alanı Doçentlik Sınavı Başvuru koşulu olarak 101 nolu madde getirilmiştir. Bu maddenin, 1-Uluslararası makale bölümünün (b) şıkkında "Uluslararası alan indeksleri tarafından taranan (1a da belirtilen indeksler dışındaki indekslerde yer alan) dergilerde yayımlanmış özgün araştırma makalesi (10 puan) istenmektedir. Uluslararası Spor Sağlık ve Tıp Bilimleri Dergisi (SSTB) alan endeksli dergi kriterlerinde yer almakta ve değerlendirilmektedir.



## ABOUT

Our Journal introduced its publishing activities in 2011. Publications are accepted from the fields accepted jointly by health sciences and sports sciences, especially including sports sciences. With the facilities brought by technology in today's conditions, our Journal entered into publication arena to meet the need for scientific studies, at least to some extent. It mainly accepts publications from such fields as sports sciences, sports education, sports medicine, history of medicine and ethics, nutrition for the athlete, athlete psychology, medical and biological sciences for sports, and "doping". Moreover, it accepts studies from the sub-branches of these scientific fields which are evaluated and assessed positively by referees expert in their fields. Studies which are included in the pharmacology, but are on athletes and athlete health are also accepted and evaluated in our Journal. Moreover, studies which are conducted in the field of forensic sciences for sports and athletes are accepted and evaluated in our Journal. Our Journal accepts and publishes studies which are originally scientific and will serve and contribute to the science world as well as research, collection and translation for these studies.

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