Original Article

Evaluation of effective demographic variables in competition performances of Turkish wrestling referees

OZKAN ISIK[1] ✉ , HUSEYIN GUMUS[2]

[1]*Faculty of Sport Sciences, Sakarya University, Turkey*
[2]*School of Physical Education and Sports, Mersin University, Turkey*

ABSTRACT

Management of wrestling competitions of equal competitors is often assigned to successful referees. For this reason, it is important to determine the demographic variables that influence the referees' level of success. In this context, the aim of the study was to evaluate the effective demographic variables in competition performances of Turkish wrestling referees using the logistic regression analysis. The purpose of this research was explained to the referees and voluntary participation was provided. The research data consist of demographic variables and the referee evaluation reports of the year 2016 calculated by the Central Referee Committee of the Turkish Wrestling Federation. The referees were classified as successful (between 7-8.5 points) and unsuccessful (between ≥8.5-10 points) according to their performance scores. Accordingly, the international referees were 49 times more successful than the national referees in a competition. The referees who wrestled at the international level were 6 times more successful than the referees wrestling at the national level and who did not wrestle. Referees whose ages 31-40 and ≥41 were 7.9 and 24.9 times more successful than ≤30 age respectively. Moreover, it was determined that those who were refereeing for social identity, a hobby, and other reasons in a competition were, respectively, 6, 39 and 22 times more possible to be successful than those who were refereeing for social status. Consequently, if a successful referee performance was desired, the ones should be selected as who were over 41 years of age and wrestled at the international level, and who were international level referees that were refereeing as a hobby or other. Thus, a more successful referee performance can be achieved in competitions. **Key words:**

WRESTLING REFEREE, OFFICIAL WRESTLING COMPETITION, REFEREE COMPETITION PERFORMANCE, SUCCESSFUL REFEREE PROFILE.

INTRODUCTION

In official competitions all over the world, athletes, coaches, and also referees are included. Athletes, coaches, and referees exhibit their performances in order to be successful in competitions. A coach, athlete, and referee in the same sports branch have a common knowledge base, but each of them has a different role. For example, the role of a coach is to train athletes, develop performance, tactics, and strategies. The role of an athlete involves physical, perceptual-cognitive training and performances. Finally, the role of the referees to the athlete and/or coach but perhaps more complex than them. Referees need a high degree of physical fitness as well as the ability to make decisions in complex positions in the application of competition rules (MacMahon et al., 2007). Therefore, performance evaluation criteria are different for athletes, coaches, and referees. This situation becomes even more complicated especially in sports involving branch diversity. For example, Olympic Wrestling, Free-style and Greco-Roman wrestling include different rules, and according to age categories, the times and rules vary. For this reason, being a wrestling referee is more complicated than being any other sports referee.

One of the earliest known combat sports by humans, wrestling has been widely taught to humanity since ancient times and it was used as training for soldiers in the past (Chapman, 1990). Nowadays, wrestling is a combat sport which is performed under certain rules and basic and combined motor abilities, as well as some sportive forms are used, and it also includes both sociological and psychological factors (Isik et al., 2013). Moreover, ≈ 25% of the medals in the Olympic Games represent combat sports such as wrestling, boxing, taek-wondo, etc., and the performance shown in these competitions is watched by millions of audience (Franchini et al., 2012). United World Wrestling often makes changes to the rules of the competition in order to increase the wrestling rating and make it more understandable for the audience (Tünnemann, 2013; Isik et al., 2014). Wrestling rules are known by all wrestling audience. Audience, athletes, coaches, and referees can give the same responses to the performance in the competition. Athletes, coaches, and audience generally want a referee to be consistent, compatible, decisive, balanced, honest, and reassuring. However, in a competition, the wrestling referee can make a wrong decision and change the course of the competition, and this can cause a successful wrestler to lose that competition. For this reason, the referees must have a good psychological situation when managing a competition, in order to minimize the factors that will influence their decisions (Ilkim and Gullu, 2016). Thus, a more successful referee performance can be demonstrated. Performance is the assessment of the level of a task (Nande and Vali, 2010). People evaluating performance make assessments based on observable tasks that demonstrate the performance of individuals within certain rules (Speers, 2008). There are many observable criteria for evaluating the performance of a wrestling referee. In this evaluation, the most effective scoring criterion is the decision of the referee while managing the competition. The performance score (between 7-10 points) of a referee depends on the points awarded by the two referee observers (evaluating independently from each other) and the chief referee appointed by the Central Referee Committee (CRC) of the Turkish Wrestling Federation (TWF). Accordingly, referees whose performance at the end of the year is between 7 and 8.5 points are classified as 'unsuccessful' and those between ≥8.5-10 as 'successful'. Competition chief referees usually are successful one's referees to conduct wrestling competitions in which equal and strong competitors are matched. Thus, they want to minimize the probability of error. If so, it is important to determine the demographic variables that influence the referees' level of success.

Although research on referees in the literature is generally based on their physical, physiological or psychological performance (Castagna et al., 2002; Goral, 2014; Yalçın et al., 2016), no research has been found which measures and/or evaluates the competition performance of referees during a year. Our research has a unique value in this direction. In this context, the aim of this research has been to evaluate the effective

demographic variables in competition performances of Turkish wrestling referees with the logistic regression analysis.

METHODS

Participants
The population consisted from 154 (International ones: 52; National ones: 102) referees. All referees were informed and voluntary participation provided. Ethical approval for this study was received from CRC of the TWF and Scientific Research and Publication Ethics Committee of Health Sciences Institute. Moreover, a total of 125 correctly completed questionnaire were obtained from 45 international and 80 national referees.

Demographic Variables
A questionnaire including demographic variables which may influence the performance of referees was conducted. Included in the questionnaire, demographic variables were age, level of refereeing, refereeing experience, whether having wrestling experience in the past and their level of wrestling, marital status, working status, the reason for being a referee, height, and body weight. Body mass indexes (BMI) are classified according to the World Health Organization (WHO) classification:

BMI: Body Weight (kg)/ Height^2 (m)
<18.5 = Underweight
18.5-24.9 = Normal
25-29.9 = Overweight
>30 = Obese (World Health Organization, 2000).

Referee Performance Evaluation Committee
The CRC of the TWF has 20 chief referees and 20 referee observers. All chief referees were from international category 1 (14 people) or category 1S (6 people). Furthermore, all referee observers composed referees who were retired from international category 1 or category 1S refereeing (Turkish Wrestling Referees Association, 2016).

Obtaining and Classifying the Referee Performance Score
The level of performance of a referee depends on the points awarded by the two referee observers (evaluating independently from each other) and the chief referee appointed by the CRC of the TWF. The average of three different performance scores in a competition is recorded as a performance score in that competition. The average of the performance scores obtained from all the competitions assigned during the year is determined as the performance score of that referee's year-end. All referees got a score between 7-10 points as a competition performance score. Accordingly, referees whose performance at the end of the year is between 7 and 8.5 points are classified as 'unsuccessful' and those between ≥8.5-10 as 'successful' (Turkish Wrestling Referees Association, 2016). In order to provide reliability of the data, 10 successful and 10 unsuccessful referees were selected randomly, together with the president of the CRC of the TWF. One competition from the 2016 year was chosen randomly for selected successful and unsuccessful referees. All videos of randomly chosen competition for the selected referees watched together with the president of the CRC of the TWF. The results of our evaluation and the competition performance scores of the referees were compared. As a result, our evaluations and the competition performance scores of the referees showed 100% agreement. This result has shown that the reliability of data obtained from the CRC of the TWF.

Referee Performance Evaluation Criteria

The referees assigned to the competitions obtained performance scores from the chief referees and referee observers taking into consideration the following characteristics:

- Interpretation and application of the competition rules,
- The ability to retain control and management of the competition,
- Taking the right position during the competition independently,
- The ability to distinguish attacks, counterattack or defense techniques between wrestlers during the competition,
- Establish communication and cooperation with other referees managing the competition,
- The seriousness and discipline of the referee,
- The ability to make independent decisions without being affected by the wrestler and wrestler's coach, manager or club while managing the competition,
- Self-confidence of the referee,
- Aesthetics of using body language,
- The courage of the referee's decisions (Turkish Wrestling Referees Association, 2016).

Referee Promotion Criteria

The age of being an international referee from UWW is 40 years. In order to become an international referee, the national referees must have at least one year experience of being a candidate referee, at least two years as a regional referee and at least three years as a national referee. Moreover, there are criteria for being an international referee. These criteria are as follows:

- Serving as a national referee for at least three years,
- The year of promotion to the international referee must have an annual performance grade ≥ 8.5,
- Being a college graduate,
- Knowing English or French, accepted as an international language by the UWW. The validity of the official Foreign Language Examination in Turkey is indefinite and ≥ 35 points are required. On the other hand, it is necessary to get ≥ 42 points from TOEFL, ≥ 3 points from IELTS. However, the validity period of the IELTS and TOEFL exams is two years (Turkish Wrestling Referees Association, 2016).

The international refereeing levels are classified as Category 3, Category 2, Category 1, Category 1S and Instructor, respectively (UWW Referee List, 2017).

Statistical Analysis

SPSS 18 software program (SPSS Inc., Chicago IL, USA) was used for statistical analysis. While comparing the demographic variables, Independent Samples T-test was used for two groups, and One-Way ANOVA was used for variables including more than two groups. Bonferroni test was used for multiple comparisons. The logistic regression analysis was used to assess the demographic variables effects on the performance of the referees. The Hosmer-Lemeshow test was used to assess the goodness of fit of the model established in the logistic regression analysis, and percentage correct classification was obtained. Cohen's Kappa Analysis was used for the inter-observer agreement. Significance was set at $p < 0.05$.

RESULTS

One hundred and twenty five (national: 80; international: 45) referees (age: 38.82 ± 8.19; body weight: 84.06 ± 14.06 kg; height: 173.82 ± 6.91 cm) participated in the study.

Table 1. Percentage and Frequency Distribution according to the Success Level of Wrestling Referees

Variables		Frequency (f)	Percentage (%)
Success Levels	Unsuccessful (<8.50)	76	60.8
	Successful (≥8.50)	49	39.2
	Total	125	100.0

When the referees participating in the research were classified according to their success levels, it was determined that 76 of the referees (60.8%) had unsuccessful referee performance and 49 (39.2%) had successful referee performance (Table 1).

Table 2. Comparison of Performance Scores According to Demographic Variables of the Wrestling Referees

Variables		f	%	$\overline{X} \pm SD$	p
Level of refereeing	National	80	64	8.17 ± 0.36	**.001****
	International	45	36	8.71 ± 0.41	
Refereeing experience (year)	≤6	49	39.2	8.12 ± 0.38	**.001****
	>6	76	60.8	8.52 ± 0.43	
Level of wrestle in the past	Did not wrestle	8	6.4	8.29 ± 0.30	.837
	National	78	62.4	8.36 ± 0.41	
	International	39	31.2	8.39 ± 0.57	
Marital status	Married	101	80.8	8.40 ± 0.42	.103
	Single	24	19.2	8.20 ± 0.56	
Working status	Public Institute	101	80.8	8.37 ± 0.43	.679
	Private Sector	24	19.2	8.32 ±0,56	
Level of education	High school	10	8	8.27 ± 0.33	.669
	University	86	68.8	8.36 ± 0.48	
	Post-graduate	29	23.2	8.41 ± 0.43	
Level of income (TL)	≤2500	27	21.6	8.17 ± 0.47	**.020***
	>2500	98	78.4	8.42 ± 0.44	
The reasons of being a referee	Social status	16	12.8	8.14 ± 0.45	.152
	Social identity	22	17.6	8.33 ± 0.35	
	Hobby	58	46.4	8.44 ± 0.38	
	Other	29	23.2	8.36 ± 0.62	

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Refereeing experience (year)	≤6	49	39.2	8.12 ± 0.38	**.001****
	>6	76	60.8	8.52 ± 0.43	
Age	≤30	21	16.8	8.13 ± 0.37[b]	**.001****
	31-40	53	42.4	8.26 ± 0.39[b]	
	≥41	51	40.8	8.57 ± 0.47[a]	
BMI (kg/m²)	Normal	22	17.6	8.30 ± 0.24	.760
	Overweight	75	60	8.38 ± 0.50	
	Obese	28	22.4	8.37 ± 0.49	

*p<0.05, **p<0.01, ab; represent the differences between the groups

When wrestling referees were compared according to the demographical variables, it was detected that there was no statistically significant difference in the variables related to marital status, working status, level of education, reasons for being a referee and wrestling level in the past (p> 0.05). On the other hand, it was found that there was a statistically significant difference according to the level of refereeing, refereeing experience, level of income, and age groups (p <0.05). According to this findings, the average performance scores of international referees were determined as 8.71±0.41, the average performance scores of >6-year referees were 8.52±0.43, and average performance scores of referees with the monthly income of >2.500 TL were found as 8.42±0.44. When the difference according to age groups was examined, it was found that while there was a difference between ≥41 age referees and ≤30 and 31-40 age referees, there was no difference between ≤30 and 31-40 age referees (Table 2).

When the model parameters of the logistic regression analysis of the model where the performance scores of wrestling referees were dependent variables were examined, it was determined that marital status, working status, level of education, level of income and BMI were not statistically significant (p>0.05), but the level of refereeing, refereeing experience, level of wrestling, the reason of being a referee and age were statistically significant (p<0.05). When Table 3 is examined, the following results are obtained:

- In a competition, international referees are 49 times more possible to be successful than national referees.
- In a competition >6-year referees are 9 times more possible to be successful than ≤6-year referees.
- It has been determined that referees who wrestled at the international level in a competition are 6 times more possible to be successful than those who wrestled at the national level and who did not wrestle.
- It has been determined that those who are refereeing for social identity, a hobby, and other reasons (e.g. sense of belonging to the wrestling community) in a competition are, respectively, 6, 39 and 22 times more possible to be successful than those who are refereeing for social status.
- In a competition, 31-40 age referees and ≥41 age referees are 7.9 and 24.9 times more successful than ≤30 age referees, respectively.

Table 3. Results of the Logistic Regression Analysis for the Success of the Wrestling Referees

Variables	β	S.D.	Wald	p	Odds Ratio
Level of Refereeing (1)	3.904	1.009	14.967	.001**	49.587
Experience of Refereeing (1)	2.225	1.001	4.947	.026*	9.257
Level of wrestle in the past					
Did not wrestle			7.949	.019*	
National	.009	1.051	.000	.993	1.009
International	1.825	1.129	3.611	.046	6.203
Marital Status (1)	.857	.851	1.014	.314	2.357
Working Status (1)	.198	.760	.068	.795	1.218
Level of Education					
High School			1.164	.559	
University	.055	.636	.008	.931	1.057
Post-graduate	1.283	1.295	.981	.322	3.606
Level of Income (1)	.261	.751	.120	.729	1.298
The reason of being a referee?					
Social Status			11.119	.011*	
Social Identity	1.856	1.265	2.153	.142	6.400
Hobby	3.685	1.302	8.004	.005	39.828
Other	3.130	1.416	4.885	.027	22.883
Age					
≤30			5.690	.048*	
31-40	2.070	.941	4.835	.028	7.926
≥41	3.219	1.470	4.795	.029	24.992
BMI					
Normal			1.554	.460	
Overweight	1.053	1.048	1.010	.315	2.867
Obese	.758	.646	1.376	.241	2.135

*p<0.05, **p<0.01*

Table 4. Success Classification Table of the Wrestling Referees

Observed	Predicted		
	Groups		Percentage Correct
	Unsuccessful	Successful	
Unsuccessful	67	9	88.2
Successful	11	38	77.6
Overall Percentage			84.0

As a result of the logistic regression analysis, the measure of the goodness of fit of the established model was found to be appropriate with the Hosmer and Lemeshow Test (Chi-Square = 13,616; p = 0,058). The overall percentage of correct classification of the model was 84% (Table 4).

DISCUSSION

The number of Olympic level referees (1 Instructor, 5 Category 1S) in Turkey is higher from all countries in the world. This result shows that Turkish wrestling referees are successful in international competitions (UWW Referees List, 2017). In this context, the primary purpose of the study was to determine demographic characteristics of successful wrestling referee's profile in a competition.

The criteria for being international wrestling referees (See; 2.6. Referee Promotion Criteria) in Turkey are more difficult than other countries and each country (e.g. England) has its own criteria (British Wrestling, 2017). Even though all the criteria are provided in order to promote international referee level, national refereeing should be performed at least seven years in Turkey before becoming an international referee (Turkish Wrestling Referees Association, 2016). This suggests that it will be less possible for Turkish referees to make mistakes in the international refereeing examinations because they manage more competitions before the international referee examinations compared to referees from other countries.

International referees' refereeing experience is higher than national referees. When considering the complex structure of wrestling, it is more possible that international referees will give correct points than the national referee in complex positions during a wrestling match. This was supported by our research results that international referees were 49 times more possible to be successful than national referees. Moreover, international referees had a higher average performance score than national referees.

Decisive whistles in a competition are not subject to challenges. Therefore, we can avoid discussions with fast and decisive provisions. Pausing will only bring discussions and challenges. It is imperative to make an action that makes a definite decision. Therefore, the referees have to give the impression that they are certain of what they see when such decisions are made (Ekmekci, 2011). Such a reaction of the referees is an act that requires experience, and referee experience is directly proportional to the number of managed competitions. In the current study, >6-year referees were 9 times more possible to be successful than ≤6-year referees. Furthermore, it was found that >6-years referees had a higher performance score average than ≤6-years referees. Moreover, Folkesson et al. (2002) reported that the interaction between the age and experience is significant. According to the results of the current study; 31-40 and ≥41 age referees were found to be 7.9 and 24.9 times more possible to be successful than ≤30 age referees, respectively. In addition, it was determined that there was a statistically significant difference between performance averages

according to age groups of referees. Accordingly, the highest average performance score was ≥41 age referees. The present study showed similar results with Folkesson et al. (2002). Indeed, promoting the referees to higher levels is related to their increasing experience and seniority (Ilkim and Gullu, 2016).

In the current study, it was found that the referees who wrestled at the international level were 6 times more possible to be successful than the referees who wrestled at the national level and who did not wrestle. Tasmektepligil et al. (2004) reported that the referees having sportsmanship experiences in the past took the advantage of these experiences during competition management. This result supports our research. The referees who wrestle at the international level in the past were more possible to be successful than other referees.

Finally, when the reason of being a wrestling referee was examined, it was found that refereeing for social identity, a hobby, and other reasons (e.g. sense of belonging to the wrestling community) were, respectively, 6, 39 and 22 times more possible compared to refereeing for social status. In the current study, it was determined that the referees refereeing for social status had the lowest referee performance average. Individuals who perform a job to earn social status may have high levels of anxiety. Individuals having a high level of anxiety be unable to perform their jobs properly, fail to adapt and be unsuccessful (Bayraktar et al., 2006). Thus, this can increase their probability of making mistakes and may cause lower averages of referee performance.

CONCLUSIONS

If a successful referee performance is desired, referees wrestling internationally in the past, over 41 years of age, having more than 6 years of refereeing experience, and refereeing as a hobby or for other reasons (e.g. sense of belonging to the wrestling community) should be selected. Thus, a more successful referee performance can be achieved in competitions. Moreover, it can be suggested that country federations should develop strategies to increase the numbers of wrestlers and competitions which will lead to an increase in the frequency of competition management of the referees. This will increase the referees' experiences and preparation performances for the international competition by increasing the number of managed competitions in the national competition.

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