International Journal of Science Culture and Sport
December 2017 : 5(4)
ISSN : 2148-1148
Doi : 10.14486/IntJSCS696

Field *: Sport Psychology, Coaching*
Type *: Research Article*
Received: *07.11.2017* **-** ***Accepted:*** *04.12.2017*

Home Advantage in Professional Football in Iran – Differences between Teams, Levels of Play and the Effects of Climate

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Abstract

Although much has been written about home advantage in football, almost all studies have used data from European countries. To address this deficiency, a single Asian country, Iran, was selected, with the aim of shedding fresh light onto the many factors currently implicated with the existence of home advantage. For each season since its creation in 2001, home advantage was quantified for each team in the Persian Gulf Pro League, adjusting for annual league variation and team ability. Data were also obtained for the level 2 Azadegan League. ANOVA was used to test for differences between teams and a stepwise regression to assess the influence of the explanatory variables which included altitude and climatic variables. Overall home advantage was 59.3%, higher than in most Asian countries. It was greater ($p<.001$) at level 2 than at level 1, and differed between teams ($p<.001$), being generally high for team locations alongside the Caspian Sea, while below average for teams from Tehran. The independent effect of playing in high humidity increased home advantage ($p<.01$), whereas it was lowered for teams playing at home in a capital city ($p<.001$). Altitude, temperature and the absence of a running track had no effect.

Keywords: football, home advantage, Iran, climate, humidity, capital city, team ability, match location

Introduction

Although there is now an ever expanding literature on home advantage (HA) in football, most studies have focused on competitions involving the countries of Western Europe. Relatively little is known about how the advantage of playing at home might operate in smaller countries in other parts of the world, especially in Asia and Africa. Pollard and Gómez (2014) attempted to broaden the scope of research into HA worldwide by calculating and comparing HA from leagues in 157 different countries. They found considerable variation between nations with unusually high HA in countries as diverse as Nigeria, Bosnia-Herzegovina, Indonesia and Guatemala. A multivariate analysis suggested several possible causative factors including altitude, distance travelled, the occurrence of a recent civil war and the degree of perceived corruption in a country. Studies carried out in specific countries have shown distance to be a factor in Australia (Goumas, 2014a), distance and climate in Brazil (Pollard, Silva, & Medeiros, 2008) territorial protection in Bosnia-Herzegovina and other Balkan countries (Pollard & Seckin, 2007) and stadium characteristics in Greece (Armatas & Pollard, 2014). In Japan, Aoyagi (2011) used a mathematical model to establish the existence of HA, showing that its magnitude for individual teams depended on team strength.

Against this background, Iran provided an attractive country in which to further investigate HA in football for several reasons. Like Brazil and Australia, it is a large country with different climatic conditions, as well as an established national football league involving all parts of the country. Moreover, Iran has considerable variation in elevation and terrain, as well as some distinct cultural divisions. Previous in-depth studies of HA within a single country have been confined mostly to Europe and none have been carried out for a country in Asia. Pollard and Gómez (2014) had found that in Iran, the home team won 60.11% of all points gained in the six seasons from 2006-07 to 2011-12, a value somewhat above the world median and the seventh highest among the 32 national leagues of Asian nations included in the study.

Three previous papers on game location in Iranian football were found, but none shed light on the magnitude or causes of HA in the country. Hemayet Talab and Mehrsafar (2016) analyzed the 2014-2015 Iranian Super League, but their data set contained errors and their method of calculating HA was incorrect, measuring home performance instead of home advantage. Rahnama, Bambaeichi, & Zarei (2009) analyzed data from the two seasons 2004-05 and 2005-06 in Iran and interestingly found that away players suffered significantly more injuries that home players, but they did not quantify HA nor did they estimate the magnitude of the role that injuries might have contributed to the advantage. Alahvisi, Maleki, & Zand Salimi (2015) found no significant difference in aggression between teams playing at home and away, but how this might relate to HA was not discussed.

Professional football in Iran began in the 2001-02 season with the creation of the Iran Pro League, renamed the Persian Gulf Pro League in 2007-08. The 16 seasons up to 2016-17 form the basis for this study. Answers to the following questions were sought:

What is the overall home advantage? How does it compare with other countries? Although relatively little is known about HA internationally, especially outside Europe, HA in Iran could be interpreted against that found in the domestic leagues of 157 countries worldwide (Pollard & Gómez, 2014).

Has it changed over the years under analysis? Several studies have suggested that a decline in HA has occurred at least since the mid-1980s (Jacklin, 2005; Pollard & Gómez, 2009; Pollard

& Pollard, 2005) although there is now evidence that this decline has leveled off (Allen & Jones, 2014; Almeida & Volossovitch, 2017).

Does home advantage at level 1 in the Persian Gulf Pro League differ from that at level 2 in the Azadegan League? The available evidence suggests that in domestic professional football leagues, HA in level 2 is at least as high and possibly higher than at level 1, especially so in Brazil (Almeida, Oliveira, & Silva, 2011) and England (Pollard, 2006).

Does it vary from team to team? Previous studies have found considerable variation between teams (Pollard & Gómez, 2009; Clarke & Norman, 1995) with teams from capital cities tending to have lower HA, and teams from remote and ethnically distinct regions having higher HA, especially so within the Balkan region of south-east Europe (Seckin & Pollard, 2008).

What climatic factors might be influencing the magnitude; in particular, temperature and humidity? In Brazil, it was shown that by far the greatest HA was enjoyed by Paysandu, a team playing in Belém at the mouth of the Amazon River in conditions that are especially hot and humid (Pollard et al., 2008).

Is altitude a factor? Countries playing home games at altitude (e.g. Bolivia) are known to have high HA as shown by Pollard and Armatas (2017), but whether or not this extends to specific teams within a single country is unknown.

Does the absence of a running track in the stadium increase HA as has been suggested by Goumas (2014b) and shown to exist in Greece (Armatas & Pollard, 2014)?

Does the size of the crowd affect HA? Goumas (2014b) has presented evidence that this can be a factor but other authors have been more cautious. For example Pollard (2006) showed no difference in HA between the top 4 levels of play in England, despite wide differences in average crowd size.

Materials and Methods

Data source

Final league tables for the Persian Gulf Pro League, including complete home and away records were obtained from www.soccerway.com for all seasons from 2001-2002 to 2016-2017. For the level 2 Azadegan League, these tables were only available from 2007-2008 to 2016-2017. This website has been used to retrieve league tables for previous research studies and found to be reliable (Pollard & Gómez, 2009; Pollard & Gómez, 2014).

Calculation of home advantage

Home advantage for each team, each season was calculated as the number of points gained at home, expressed as a percentage of all points gained at home and away, a standard method in use for many years (Pollard, 1986). Thus a value of 50% represented no HA since the same number of points were gained at home as away; the greater the value above 50%, the greater the advantage of playing at home for that team. The same procedure was followed to quantify HA for a whole league in a season. Thus a value of 60% for a league meant that the home team gained 60% of all points won during that season.

Quantification of climatic variables and elevation

Three climatic variables were included in the analysis, assessed over the 10 month playing season which runs from August of one year to May of the next. These were average maximum temperature (degrees Celsius), total rainfall (mm) and average humidity (%). Readings were taken from the city in which each team played its home games. The elevation (m) of the home stadium was also recorded. Data were obtained from the website https://en.climate-data.org/ and from the Wikipedia entries for the individual cities.

Crowd size

Information on crowd size was incomplete and it was not possible to obtain average attendance for each team each year. Although this variable could not be included in the main analysis, some attendance data was available on www.soccerway.com, as well as on the Wikipedia pages on the Persian Gulf Pro League each season.

Team ability

Team ability has been shown to be related to HA when based on points won and lost and thus needed to be controlled for when comparing the different teams (Pollard & Gómez, 2009). It was quantified for each team, each season by dividing the total number of points gained by the number of games played.

Data analysis

The initial analysis involved the calculation of HA for each team each season and then deriving an adjusted value taking into account team ability and also the overall HA for the season in question. This followed the rationale and methodology described in Pollard and Gómez (2009) and subsequently used in other studies. Since not all teams played in all 16 seasons under analysis in the Persian Gulf Pro League, for each team the mean annual adjusted HA value was calculated, based on the seasons in which each particular team participated.

A one-way analysis of variance was used to establish whether or not a significant difference existed between the teams. Adjusted HA was used as the dependent variable, calculated for each team each season. In order to investigate the explanatory role of the three climatic variables as well as elevation, a multivariate regression approach was used. HA for each team each season was the dependent variable giving a total of 262 observational units. The following explanatory variables were investigated: team ability for each team each season, season overall HA, elevation of home stadium, humidity, rainfall, temperature, whether or not the team was located in the capital city Tehran, and whether or not the home stadium had a running track. A stepwise approach was adopted using the statistical software Minitab 17 (Minitab, Inc, 2016). To test for a difference between the two levels of play, a paired t-test was used for annual overall HA. This was confined to the ten seasons for which data was available for both the Persian Gulf Pro League (level 1) and the Azadegan League (level 2).

Results

Table 1 lists the 39 teams that have appeared in the Persian Gulf Pro League in descending order of adjusted HA. A considerable and significant variation between teams existed ($p<0.001$), differences between teams accounting for 30.7% of the total variation in the adjusted HA values for the 262 team seasons included in the analysis (Table 2). The term ‘team season’ refers to the value of a particular team in a particular season. For teams with more than four seasons of data, Aboumoslem, from the city of Mashhad, had easily the

highest adjusted HA, winning over 70% of its total points from home games, a figure that is high by recent international standards. None of the eight teams from Tehran had an adjusted HA value above 60%.

Table 1. Home advantage for teams in Persian Gulf Pro League 2001/02 – 2016/17

Location	Name of team	Seasons	Home points	Away points	HA (%)	HAadj (%)
Sarcheshmeh	Mes Sarcheshmeh	1	20	4	83.33	81.59
Mashhad	Aboumoslem	9	246	93	72.57	70.59
Noshahr	Shamoushak	3	56	18	75.68	68.09
Dorud	Gahar Zagros	1	14	5	73.68	66.91
Hamadan	PAS Hamadan	4	111	51	68.52	65.69
Mashhad	Siah Jamegan	2	37	20	64.91	65.31
Bandar-e Anzali	Malavan	14	337	171	66.34	65.20
Tabriz	Gostaresh Foulad	4	89	51	63.57	64.61
Abadan	Sanat Naft	6	133	71	65.20	64.50
Kerman	Sanat Mes Kerman	8	233	121	65.82	64.21
Masjed Soleyman	Naft Masjed	1	15	7	68.18	63.56
Rasht	Damash Gilan (Pegah)	8	160	89	64.26	63.40
Isfahan	Sepahan	16	491	336	59.37	60.97
Ahvaz	Esteghlal Khuzestan	4	88	66	57.14	60.73
Shiraz	Bargh Shiraz	8	163	95	63.18	60.39
Bushehr	Shahin Bushehr	3	68	39	63.55	60.31
Ahvaz	Esteghlal Ahvaz	9	199	119	62.58	60.25
Tehran	Paykan (Tehran)	7	148	95	60.91	59.89
Isfahan	Zob Ahan	16	447	303	59.60	59.81
Ahvaz	Foolad	15	403	277	59.26	59.29
Tehran	Persepolis	16	469	347	57.48	58.88
Tehran	Naft Tehran	7	183	154	54.30	57.24
Qom	Saba Qom	13	310	233	57.09	56.77
Shiraz	Fajr Sepasi	12	253	185	57.76	56.48
Bandar Abbas	Aluminium Hormozgan	1	21	14	60.00	56.43
Tehran	Esteghlal	16	475	401	54.22	56.31
Tabriz	Tractor Sazi	9	247	214	53.58	56.22
Qazvin	Paykan (Qazvin)	3	71	50	58.68	55.82
Mashhad	Padideh	3	59	47	55.66	55.67
Yazd	Shahid Ghandi	1	12	7	63.16	55.40
Tehran	Saipa	16	350	278	55.73	54.44
Tehran	Rah Ahan	11	221	166	57.11	54.13
Tehran	PAS Tehran	6	144	131	52.36	52.87
Qods	Paykan (Qods)	2	38	32	54.29	52.61
Tabriz	Shahrdari Tabriz	2	37	34	52.11	48.78
Mashhad	Payam Mashdad	1	18	17	51.43	47.62
Tehran	Steel Azin	2	40	40	50.00	47.13
Kermanshah	Shirin Faraz (Rahian K.)	1	10	11	47.62	43.45
Tabriz	Machine Sazi	1	7	9	43.75	41.04
	All teams	16	6423	4401	59.34	-

Note: 'HAadj' is HA adjusted for differences in team ability and annual HA.

Table 2. One way analysis of variance for teams, with adjusted home advantage as the dependent variable

Source	DF	SS	MS	F	P
Team	38	6144.6	161.7	2.60	<0.001
Error	223	13879.4	62.2		
Total	261	20024.0			
S = 7.889 R-Sq = 30.69%					

Note: Analysis based on 262 'team seasons', each representing a particular team in a particular season.

The final result of the stepwise multiple regression analysis is shown in Table 3. As expected the mean annual HA and team ability both had a significant relationship with HA, allowing the remaining variables to be assessed after controlling for these factors. Of the climatic variables under consideration, humidity was included in the final model, but rainfall and temperature were not. Each extra percentage point of humidity increased HA by an average 0.15 percentage points. The presence or absence of a running track did not have a significant effect, neither did the elevation of the home stadium, but being located in the capital city Tehran lowered HA by a highly significant average of 4.63 percentage points.

Table 3. Results of stepwise regression with home advantage for each team each season (n = 262 team seasons) as the dependent variable

Predictor	B	SE(b)	T	P
Constant	-0.16	10.270	-0.02	0.988
Annual HA	0.999	0.163	6.11	<0.001
Team ability	-4.065	1.515	-2.68	0.008
Capital city	-4.630	1.159	-3.99	<0.001
Humidity	0.148	0.046	3.18	0.002
S = 8.369 R-Sq = 25.6%				

Note: The regression equation is: HA = - 0.160 + 0.999(Annual HA) - 4.065(Team ability) - 4.630(Capital city) + 0.148(Humidity)

Table 4 shows the changes in HA during the 16 years of the league's existence as well as the difference between the two levels of competition which was significant for the 10 years from which comparisons can be made. For these years the mean HA for level 1 was 58.5%, significantly lower than the 64.5% for level 2 ($t = 7.87$, d.f. = 9, $p<0.001$).

Table 4. Home advantage (%) at the top two levels of professional football in Iran

Season	Persian Gulf Pro League Level 1	Azadegan League Level 2	Difference
2001-02	59.63	*	*
2002-03	55.17	*	*
2003-04	66.39	*	*
2004-05	60.25	*	*
2005-06	61.65	*	*
2006-07	60.38	*	*
2007-08	57.93	66.90	8.97
2008-09	60.39	64.14	3.75
2009-10	62.36	65.24	2.88
2010-11	63.50	67.15	3.64
2011-12	56.10	63.49	7.39
2012-13	60.15	64.80	4.65
2013-14	54.03	61.70	7.68
2014-15	59.18	66.67	7.48
2015-16	55.89	65.12	9.23
2016-17	55.89	60.00	4.11

*Note: * = information not available.*

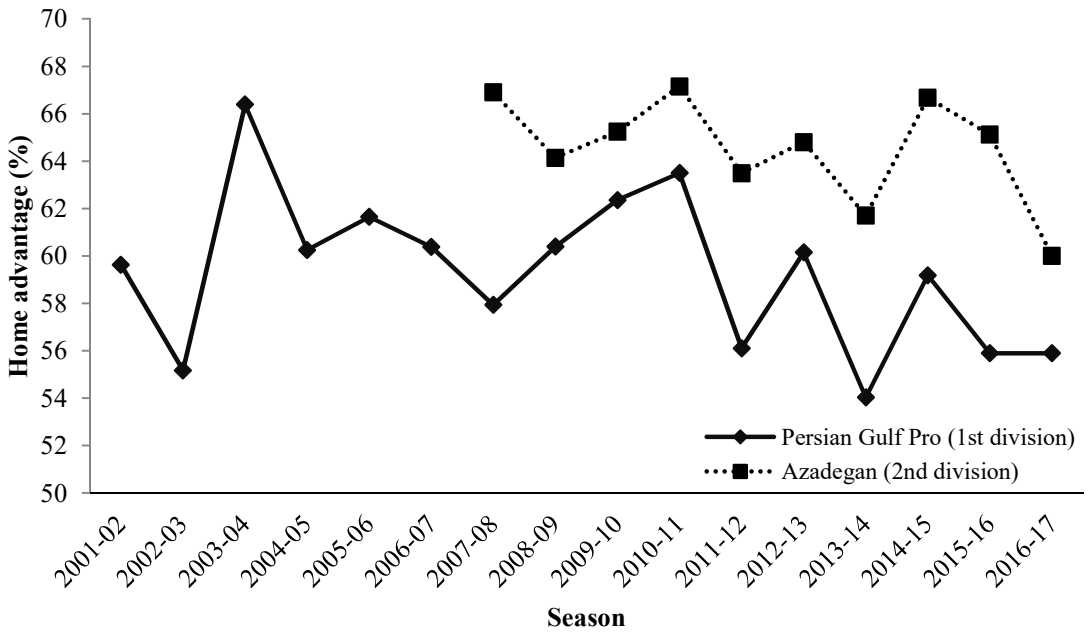

Figure 1. Comparison of home advantage in top two levels of professional football in Iran.

Discussion

Returning to the questions posed in the introduction and which provided the motivation for the study, the analysis has provided the following answers, each of which will be discussed in the context of current knowledge about HA.

Overall home advantage

The Persian Gulf Pro League was created in 2001 and the analysis covers the full 16 seasons that have taken place since then. The overall HA for these years is 59.34%, which represents the proportion of all points that have been won by the home team. In comparison to average HA reported internationally for the period 2006 – 2012 (Pollard & Gómez, 2014), this is slightly below the major leagues in Europe. These were for France and England (61%), and for Spain and Italy (62%). The median value for countries in Asia was 57.0%, while the worldwide median was 58.4%. Little can be concluded from all this other than the fact that HA does exist in Iran at a level that is somewhat higher than average internationally and thus a promising place in which to further investigate possible causes.

Change over time

After considerable annual variation up to about 2012, HA in the Persian Gulf Pro League seems to have settled down to a lower level, currently 55.9% in the last two seasons. The same time period from 2011-2012 has seen a slow decline at level 2 in the Azadegan League. Any conclusion would be somewhat speculative, but the evidence would be consistent with a decline followed by a leveling off seen elsewhere, and certainly no indication of an increase.

Differences between levels

The main feature of Table 4 is the consistent and highly significant greater HA at level 2 compared with level 1. Although this may seem somewhat surprising in view of the greater attendance at level 1, this is consistent with other leagues for which this has been investigated, especially in England where every decade since the creation of a second level in 1892-93, HA at level 2 has been greater than at level 1 (Pollard, 2006). Possible explanations which may apply in Iran include the much more comfortable travel now enjoyed at level 1 compared with level 2, as well as the more intense support which may exist in smaller more isolated locations such as are found at level 2 and which have been suggested as a factor in increased HA in various other countries including Turkey (Seckin & Pollard, 2008). In addition, players at level 1 are likely to have been better trained to cope with the adverse psychological and physiological effects of performing away from home. Likewise level 1 will have better referees, trained not make decisions influenced by the reaction of the crowd (Almeida & Volossovitch, 2017).

Variation between teams

There were large and highly significant differences in HA between the teams. There are several possible explanations for this, some of which may be interacting with each other, so that interpretation will inevitably be somewhat speculative. Three observations can be made from a quick inspection of Table 1. First, the very high HA enjoyed by Aboumoslem, a team from the far north-eastern city of Mashhad, the second largest in Iran; secondly the generally low HA in teams from Tehran, the capital city, and thirdly the well-above average HA of the three teams situated close to the Caspian Sea, Shamoushak in Noshahr, Malavan in Bandar-e Anzali and Damash Gilan (formerly named Pegah prior to 2008), located in Rasht.

There is no obvious explanation for the high HA of Aboumoslem, although it should be noted the team has not been in the Persian Gulf Pro League since the 2009-10 season, a fact that would need to be included in any future attempt to research this unusually high HA. Moreover, in the four seasons that Aboumoslem subsequently spent in the level 2 Azadegan League, their HA was 69.1%, well above the 63.9% for the other teams in the league over the same period. All this means that the high HA for Aboumoslem is a real phenomenon with no clear cause, and a worthwhile topic for follow-up research.

The generally low HA for the teams from Tehran, the capital city, was not unexpected in the light of previous research that had found HA for teams in London, Paris, Lisbon, Madrid, Istanbul and Athens, all to have lower HA than teams throughout the rest of their respective countries (Armatas & Pollard, 2014; Pollard & Gómez, 2009; Clarke & Norman, 1995; Seckin & Pollard, 2008), partly due to the extra number of local derbies involving teams from the same city. It was also suggested that capital cities are generally the home of more than one team, so that no team will have a sense of territorial protection apparent for single teams in more remote locations. Similarly players from visiting teams will likely have some familiarity with the capital city, weakening one of the hypothesised disadvantages of playing away from home.

Crowd size might have been expected to have had some effect on HA, but there was no evidence of this. Attendance is highly variable in Iran, with the home games of Tehran teams Esteghlal and Persopolis and to a lesser extent Tractor Sazi in Tabriz attracting average crowds of over 20,000, with some games filling the national stadium with 80,000 spectators. All these teams had below average HA. No other team in Iran had average attendance above 10,000, some well below this number with many games being played in front of only a few hundred spectators.

The teams located along the Caspian Sea have distinct environmental factors that might give them an advantage when playing at home. These include high humidity, high temperature and low elevation all of which will be considered further in the next section.

Climatic factors

Three climatic variables were included in the general linear model analysis reported in Table 3. The stepwise approach soon eliminated both rainfall and temperature as having an influence on HA, but humidity remained in the final explanatory model as having a highly significant effect. The highest humidity levels in Iran occur along the Caspian Sea. Average humidity during the playing season is 85% in Noshahr and Bandar-e Anzali, and 83% in Rasht, all well above any other city in which a Persian Gulf Pro League team played. Thus, the humidity factor is a plausible explanation for the high HA enjoyed by teams playing in these cities. To explore this idea further an analysis was done on the performance of teams from the Caspian Sea region in the Azadegan League. In addition to the same three cities already mentioned, there were two teams from Qaem Shahr and one from Babol. The combined HA of all these Caspian Sea teams in the Azadegan League was 68.7% compared with 64.0% for other teams in the league, lending further support for the hypothesis that home teams derive an advantage by playing at locations of high humidity.

Altitude

As with temperature, the variable representing the altitude of the stadium of the home team did not have a significant effect on HA. This was not surprising in view of the fact that all games took place below the 2000m elevation, above which the effects of altitude might be

expected to affect performance at football, according to a group of experts convened by FIFA (Bärtsch, Saltin, & Dvorak, 2008). However, it should be noted that many teams did perform at home above 1200m, the altitude at which Nassis (2013) believed that footballers start to experience a negative effect on endurance. Interestingly, the three Caspian Sea teams actually play below or just above sea level, but it appears to be the humidity and not the altitude, or lack of it, that is affecting HA.

Running track

Two previous studies had suggested the presence of a running track inside a stadium reduces HA, because it distances the game action from the spectators and thus lessons the influence of the crowd on the players and the referee (Armatas & Pollard, 2014; Goumas, 2014b). The analysis in Iran produced no evidence in support of this.

Limitations

Although the study was able to incorporate several variables implicated with HA, it was not possible to specifically include crowd size in the multivariate analysis due to the limited availability of data and the fact that a value averaged over a season would mask the highly variable attendances at specific games. Similarly the approach used precluded travel distance as a variable, as this also varied considerably from game to game. To overcome these problems, a match by match analysis would need to be done along the lines of a recent study of HA in World Cup qualification (Pollard & Armatas, 2017). This is a feasible avenue for future research, as are studies similar to the present one based on other individual countries in Asia, Africa and elsewhere thanks to the increasing availability of home and away league tables and other quantitative information relevant to HA.

Practical implications

From a practical perspective, awareness of the existence of HA and its causes is confirmed as an important aspect of match preparation for away games. This has now been shown to be the case in a part of the world where little previous knowledge of HA existed. Results suggest the need for careful consideration of the possible difficulties, both psychological and physiological, in performing at specific away venues, in any country and at any level of play. Although Pollard (2008) made some suggestions about how away game preparation might be approached, this is an area in which sports psychologists might be encouraged to contribute further.

Conclusion

The existence of HA was established for professional football in Iran, both at level 1 and especially at level 2, with HA being slightly above the world median and higher than in most Asian countries. There was evidence of a decline in HA since 2011-12. There was considerable variation between teams, with Aboumoslem Mashhad and the teams located near the Caspian Sea having especially high values, while the teams from Tehran were all below average. After controlling for mean seasonal HA and for team ability, both local mean humidity level and being located in the capital city had a significant effect on the magnitude of HA. Altitude, other climatic variables and the presence or not of a running track did not.

Conflicts of Interest

The authors have no conflicts of interest to acknowledge.

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