SPORT I TURYSTYKA
Środkowoeuropejskie Czasopismo Naukowe

UNIWERSYTET JANA DŁUGOSZA
W CZĘSTOCHOWIE

2024
t. 7, nr 3

received: 11.11.2023; accepted: 1.03.2024 http://dx.doi.org/10.16926/sit.2024.03.05

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HOME ADVANTAGE IN THE CZECH FOOTBALL LEAGUE BEFORE, DURING AND AFTER THE COVID-19 PANDEMIC

How to cite [jak cytować]: Pelloneová N. (2024). Home advantage in the Czech football league before, during and after the COVID-19 pandemic. *Sport i Turystyka. Środkowoeuropejskie Czasopismo Naukowe*, *7*(3), 77–92.

Przewaga gospodarzy w czeskiej lidze piłkarskiej przed, w trakcie i po pandemii COVID-19

Streszczenie

Pandemia COVID-19 miała ogromny wpływ na profesjonalną piłkę nożną i doprowadziła do wprowadzenia dużych ograniczeń dla widzów. Najbardziej znaczącym był zakaz wstępu na stadion dla widzów.

Niniejszy artykuł ocenia przewagę gospodarzy i zakres wpływu pandemii COVID-19 na przewagę gospodarzy w profesjonalnej piłce nożnej mężczyzn w czeskiej Ekstraklasie. Rezultaty badań mogą pomóc w kilku obszarach podejmowania decyzji, np. w strategiach gier zespołowych lub strategiach obstawiania. Badanie porównuje wyniki meczów rozgrywanych z udziałem widzów z wynikami meczów rozgrywanych bez udziału widzów lub z ograniczeniami dla widzów. Metoda wybrana do ilościowego określenia przewagi gospodarzy uwzględnia punkty i strzelone bramki oraz wykorzystuje test dwóch prób Mann-Whitney'a . Pandemia COVID-19 nie miała statystycznie istotnego wpływu na przewagę gospodarzy. Przewaga środowiska domowego utrzymywała się nawet bez widzów, choć w mniejszym stopniu. Badanie wykazało, że przewaga gospodarzy może zostać zmniejszona, ale nie utracona w przypadku braku widzów. Jednak w przyszłych badaniach potrzebne są bardziej szczegółowe analizy, aby zidentyfikować główne determinanty tego zjawiska w różnych ligach piłkarskich i krajach.

Słowa kluczowe: sport, piłka nożna, widzowie, frekwencja, koronawirus.

Abstract

The COVID-19 pandemic disease had a huge impact on professional football and led to the introduction of significant spectator restrictions. The most significant restriction was the banning

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of spectators from entering the stadium. This paper evaluates home advantage and the extent of the impact of the COVID-19 pandemic on home advantage in men's professional football in the Czech top football league. The research findings can be useful in various decision-making areas, such as team game strategies or betting strategies. The research compares the results of matches played with spectators with the results of matches played without spectators or with spectator restrictions. The method chosen to quantify home advantage considers points and goals scored and uses a two-sample Mann-Whitney test. The COVID-19 pandemic had no statistically significant effect on home advantage. Home advantage persisted even without spectators, although to a lesser extent. The research concluded that home advantage may be reduced but not lost in the absence of spectators. However, more detailed analyses are needed in future studies to identify the main determinants of this phenomenon across football leagues and countries.

Keywords: sport, soccer, spectators, attendance, coronavirus.

Introduction

Spectators and fans are an important component in any professional sport. From a scientific perspective, spectators are considered a major contributing factor to sporting success (Daumann, 2019). In this context, the influence of spectators and fans is mainly manifested in the so-called home advantage. Home advantage has been investigated in the field of sport for many years. The first empirical paper to investigate the extent and main causes of home advantage in different sports leagues was the research by Schwartz and Barsky (1977). Their research in American major baseball league, professional and college football, ice hockey, and college basketball revealed a significant home team advantage. According to the research conducted, home teams win more than half of their games (excluding draws) if home, and away games are evenly distributed throughout the season. Thus, a corresponding relative dominance of home teams over away teams can be assumed – albeit to varying degrees and based on different explanations (Buraimo et al., 2012; Courneya & Carron, 1992; Pollard, 2008; Pollard & Pollard, 2005;Jones, 2013; Nevill & Holder, 1999; Pollard et al., 2017). The authors mentioned above agree on several factors that influence the outcome of a game, such as audience influence, travel influence, pitch familiarity, referee bias, territoriality, specific tactics, rules factors, and psychological factors. However, according to most authors, the main causal factor is the proximity of fans and spectators to the playing field and the cheering and chanting that inspires and encourages home players to try harder and ultimately win the game (Bray & Martin, 2003). Football is one of the sports with traditionally the most significant home advantage (Jamieson, 2010; Pollard & Pollard, 2005; Leite & Pollard, 2018), although there are differences between countries (Pollard, 2006) and between men's and women's leagues (Pollard & Gómez, 2009; Pollard & Gómez, 2012; Pollard et al, 2017; Clarke &Norman, 1995; Pollard, 1986).

A fundamental limitation of most research is that it has not yet been possible to study matches without spectators over long periods of time. Never in the history of football has there been such a large-scale opportunity to examine the effect of spectator absence on the performance of sports teams or individuals. One is limited to a few studies that have examined Italian league matches played without spectators for safety reasons (e.g. Van de Ven, 2011). These were always only a few matches where the football club was punished with this sanction. The global pandemic COVID-19 brought a number of restrictions at the beginning of 2020, among others, a ban on the assembly of people at sporting events. The main reason for this ban was public health concerns. As a result of these restrictions, research on the impact of fans on home advantage could be conducted. The COVID-19 pandemic meant that for all sporting disciplines in the world, spectators were banned from entering stadiums. The COVID-19 pandemic had the harshest economic impact on football leagues in particular. But the COVID-19 pandemic, on the other hand, provided a unique opportunity to conduct research on the impact of fans on home advantage.

Several such studies were conducted between 2020 and 2022 (Cueva, 2020; Dilger & Vischer, 2020; Peeters & van Ours, 2020; Endrich & Gesche, 2020; Sorset al. 2021; Tilp & Thaller, 2020; Higgs & Stavness, 2021; Wunderlich et al., 2021; Almeida & Leite, 2021). These are mainly studies of the world's major football leagues. For example, research by Reade et al. (2021) found a significant reduction in the percentage of home wins (43.8% with spectators versus 41.2% without spectators). McCarrick et al. (2021) examined all European football leagues that played a season without spectators. The results of the study showed that teams with spectator presence in the home stadium won on average 0.39 points per game more than in away games. On the other hand, teams without spectators at home won by an average of 0.22 points per game more than in away games. Bryson et al. (2020) examined 1,500 matches without spectators and found that the absence of spectators consistently reduced home advantage. Scoppa (2021) presented evidence of a reduced home advantage across the five major European football leagues (Germany, Spain, England, Italy and Portugal). Scoppa (2021) found a significant home advantage mainly in performance indicators (points and goals). During matches without spectators, this advantage is almost halved. Cueva (2020) researched 41 football leagues and found that home advantage drops by about half as a result of COVID-19 in match outcomes. The available analyses are not consistent in terms of the effect of spectators on home advantage. Despite the evidence of a reduced home advantage during the COVID-19 pandemic, there is variation in the intensity of this reduction, ranging from a strongly reduced to a slightly reduced home advantage. Only the research by Matos et al. (2021) and Ramchandani and Millar

(2021) concluded that the absence of spectators had no effect on home environment advantage according to the variables chosen.

While recent work has examined the effect of COVID-19 restrictions on home advantage in the leading European football leagues, relatively few studies have looked at the impact of restrictions in Central Europe. The presented research aims to enrich this area with further findings from the Czech professional football league. No research has examined the existence of home advantage in the Czech football league. However, Czech football is comparable with other European leagues. Several Czech clubs regularly participate in UEFA club competitions, including the Champions League and Europa League. The research examines matches played with and without spectators in the top Czech men's football league called Fortuna:Liga, which took place in the seasons 2017/18 to 2022/23. In line with the above mentioned literature, the research aims to quantify home advantage and subsequently test the impact of the COVID-19 pandemic on home advantage in the Czech professional football league. The results obtained may be relevant for sports managers, media personnel, fans and others working in the football industry.

Material and Methods

The analysis focused on the top Czech football league. For sponsorship reasons, the top Czech football league is referred to as FORTUNA:LIGA (hereinafter Fortuna:League). Fortuna:League was examined based on sports data for six seasons (2017/18 to 2022/23). All regular season matches were included in the analysis, as well as any playoff and relegation (retention) rounds. Playoff and retention rounds were introduced in Fortuna:League in the 2018/19, 2019/20, 2021/22 and 2022/23 seasons. In the 2017/18 and 2020/21 seasons, only the regular season was played. 21 teams participated in Fortuna:League during all six seasons examined, and these were the following: FC Viktoria Plzen, SK Slavia Prague, FK Jablonec, SK Sigma Olomouc, AC Sparta Prague, FC Slovan Liberec, Bohemians Prague 1905, FK Teplice, FK Mlada Boleslav, FC Zlin, FK Dukla Prague, 1.FC Slovacko, FC Banik Ostrava, MFK Karvina, FC Vysocina Jihlava, FC Zbrojovka Brno, Slezsky FC Opava, 1.FK Pribram, SK Dynamo Ceske Budejovice, FK Pardubice and FC Hradec Kralove.

In the 2017/18, 2018/19 and 2022/23 seasons, all Fortuna:League matches were played with spectators. Fortuna:League was affected by the COVID-19 pandemic in the 2019/20 to 2021/22 seasons. It is important to note that it concerned varying degrees of restrictions and limitations. In the 2019/20 season, some matches were played entirely without spectators (see Table 1). During the last five rounds of the regular season, there were restrictions on the maximum

number of 100 spectators per stadium. The playoff and retention rounds were played with a maximum capacity of 1,000 spectators. The 2020/21 season was played almost entirely without spectators. Spectators could return in limited numbers (max 1,000 spectators) on May 1, 2021. Therefore, they only saw the last four rounds of the regular season (i.e. 36 matches). This season was hit the hardest by the COVID-19 pandemic. In the 2021/22 season, due to the ongoing COVID-19 pandemic, stadiums' capacity also had to be reduced. From the first round onwards, the following was determined – stadiums with a capacity of up to five thousand could be sold out, for stadiums with a capacity of five to ten thousand a maximum of five thousand spectators was in place, and for stadiums above 10,000 capacity it was possible to fill the stadium up to 50% while maintaining a spacing of at least one seat (see Table 1).

Based on Pollard (1986), the number of points and the number of goals scored in home and away matches was assessed. The data on individual football matches was obtained from the data on the website of the top football competition Fortuna:League operated by LFA & 2Score, s .r. o. and eSports s. r. o. (2023), and from Livesport.cz (2023). This data includes the number of points scored per match (3 points for a win, 1 point for a draw, 0 points for a loss) and the number of goals scored. In total, 1646 individual matches from the top Czech football league were analysed. The dataset is divided into matches played under normal circumstances (N = 984) and matches played without spectators (N = 279) or with spectator restrictions due to the COVID-19 pandemic (N = 383). Detailed data for each season are presented in Table 1.

Table 1
Overview of evaluated sports competitions

Season	Attendance	Number of matches	Matches being played under normal circumstances	Matches without spectators due to the COVID-19 pandemic	Matches with partial attendance due to the COVID-19 pandemic
2017/18	WR	240	240	0	0
2018/19	WR	277	277	0	0
2019/20	WR/WS/R*	271	191	9	71
2020/21	WS/R*	306	0	270	36
2021/22	R*	276	0	0	276
2022/23	WR	276	276	0	0
	Total	**1646**	**984**	**279**	**383**

* seasons affected by COVID-19, WR: without restrictions, R: restrictions, WS: without spectators.

The Shapiro-Wilk test and the two-sample Mann-Whitney U test were used to evaluate the data. The Shapiro-Wilk test was used to test the normality of

sports statistics (number of points scored and number of goals scored). The null hypothesis states that the sample of data analysed belongs to a normal distribution. The alternative hypothesis states that the data sample does not belong to a normal distribution. The test statistic to assess the normality of the data is the W statistic, which, according to (Budíková et al., 2010), is given by relation (1). The test statistic W reaches the value of 1 if the data shows a perfect fit to the normal distribution. If the value of the test statistic W is statistically significantly less than 1, the null hypothesis can be rejected and the alternative hypothesis accepted.

$$W = \frac{b^2}{S^2} = \frac{(\sum_{i=1}^{k} a_{n-i+1}(y_{n-i+1}-y_i))^2}{\sum_{i=1}^{n}(y_i-\bar{y})^2} \quad (1)$$

The non-parametric two-sample Mann Whitney U test was also applied to the sports data. The Mann Whitney U test is a non-parametric analogue of the test of the identity of the means of two independent random sets (X_1, X_2, ..., X_m) and (Y_1, Y_2, ..., Y_n) with different numbers of elements (Nachar, 2008). The null hypothesis H_0 states that the data samples have identical means. The alternative hypothesis H_1 states that the data samples do not have identical means. The null hypothesis can be written as $\mu_1 = \mu_2$. The alternative hypothesis can be written as $\mu_1 \neq \mu_2$. The test assumes that (X_1, X_2, ..., X_n) is a random selection from some continuous distribution and (Y_1, Y_2, ..., Y_n) is an independent random selection from the same continuous distribution that is shifted by a constant δ with respect to the former. Thus, the random variables (X_1, X_2, ..., X_m) and (Y_1, Y_2, ..., Y_n-δ) have the same distribution. The test statistic for the Mann Whitney U test is denoted U and is the smaller of U_1 and U_2, defined below (2). In relation (2), R_1 is the sum of the ranks for group 1 and R_2 is the sum of the ranks for group 2.

$$U_1 = n_1 n_2 + \frac{n_1(n_1+1)}{2} - R_1 \text{ or } U_2 = n_1 n_2 + \frac{n_2(n_2+1)}{2} - R_2 \quad (2)$$

In the present research, the null hypothesis assumes that there are no significant differences between the values of the two selections' statistics ($\mu_H = \mu_A$). One-sided and two-sided tests were conducted to distinguish between the alternative hypothesis. In case of rejection of the null hypothesis, either $\mu_H \neq \mu_A$, or $\mu_H > \mu_A$ (resp. $\mu_H < \mu_A$) was accepted. The Shapiro-Wilk test and the Mann Whitney U test, which served as the basis for the outcomes reported in this research, were conducted at the 5% significance level. All analyses were conducted using SPSS statistical software (IBM, 2023).

Results

Table 2 provides an overview of the results of the examined matches. In addition to the absolute frequencies, it shows what percentage of matches in each

season ended in a home win, a draw and an away win. In Fortuna:League, a higher proportion of matches that ended in a home win was recorded in each season analysed. In the last pre-pandemic 2018/19 season, home teams won more than half of their matches. The 2019/20 season of the Czech Fortuna:League also surprisingly stands out (despite the 80-match spectator restrictions) for its relatively high number of home wins. Fundamental changes were captured in the 2020/21 season, in which the strictest spectator restrictions were introduced (more than 88% of matches played without spectators). The proportion of draws increased slightly compared to the 2018/19 and 2019/20 seasons. We find a significant increase in the number of away wins, which are more than 32%. At the same time, there is a decrease in the number of home wins, which is the lowest of all five seasons examined (41.18%). The following season, 2021/22, already shows a slight increase in home wins again and the values are close to seasons without spectator restrictions. In the last season analysed, which was already without any restrictions, the winning percentage of home teams was 43.12%. This value is slightly lower than in the seasons before the COVID-19 pandemic.

Table 2
Proportion of match outcomes before and after COVID-19

Seasons	Matches	Home wins	Draws	Away wins
Season 2017/18	240	112 (46.67%)	68 (28.33%)	60 (25.00%)
Season 2018/19	277	145 (52.35%)	55 (19.86%)	77 (27.80%)
Season 2019/20*	271	136 (50.18%)	67 (24.72%)	68 (25.09%)
Season 2020/21*	306	126 (41.18%)	80 (26.14%)	100 (32.68%)
Season 2021/22*	276	131 (47.46%)	71 (25.72%)	74 (26.81%)
Season 2022/23	276	119 (43.12%)	68 (24.64%)	89 (32.25%)

* seasons affected by COVID-19

Table 3 shows descriptive statistics for all 1646 games played. Football teams scored more points on average in home games than away games in each season analysed. The individual differences are captured in Table 3. The largest difference was recorded in the 2019/20 season for a total of 0.753 points per game, with a median of three points in that season. The smallest difference was recorded in the 2020/21 season with a total of 0.261 points per game. In home games in each season analysed, the teams scored more goals on average than in away games. The largest difference was recorded in the 2019/20 season with a total of 0.672 goals per game; the median was zero in that season. The smallest difference was recorded in the 2020/21 season with a total of 0.255 goals per game.

Table 3
Summary statistics for the seasons 2017/18 to 2022/23

		number of points (home)	number of goals (home)	number of points (away)	number of goals (away)	point difference	goal difference
Season 2017/18	Mean	1.683	1.363	1.033	1.021	0.650	0.342
	St. Dev.	1.287	1.131	1.213	1.133	0.074	-0.003
	Min.	0	0	0	0	0	0
	Median	1	1	1	1	0	0
	Max	3	5	3	5	0	0
Season 2018/19	Mean	1.769	1.560	1.032	1.116	0.736	0.444
	St. Dev.	1.337	1.300	1.281	1.219	0.056	0.080
	Min.	0	0	0	0	0	0
	Median	3	1	0	1	3	0
	Max.	3	6	3	8	0	-2
Season 2019/20*	Mean	1.753	1.642	1.000	0.970	0.753	0.672
	St. Dev.	1.303	1.407	1.229	1.032	0.074	0.374
	Min.	0	0	0	0	0	0
	Median	3	1	0	1	3	0
	Max.	3	7	3	5	0	2
Season 2020/21*	Mean	1.497	1.471	1.235	1.216	0.261	0.255
	St. Dev.	1.316	1.353	1.287	1.190	0.030	0.163
	Min.	0	0	0	0	0	0
	Median	1	1	1	1	0	0
	Max.	3	7	3	6	0	1
Season 2021/22*	Mean	1.681	1.623	1.069	1.152	0.612	0.471
	St. Dev.	1.307	1.228	1.250	1.162	0.057	0.066
	Min.	0	0	0	0	0	0
	Median	1	1	1	1	0	0
	Max.	3	6	3	5	0	1
Season 2022/23	Mean	1.540	1.645	1.214	1.312	0.326	0.333
	St. Dev.	1.327	1.395	1.297	1.111	0.031	0.284
	Min.	0	0	0	0	0	0
	Median	1	1	1	1	0	0
	Max.	3	7	3	6	0	1

* seasons affected by COVID-19

The main objective of the research was to determine whether there were statistically significant differences between the number of points and the num-

ber of goals scored during home matches (selection H) and away matches (selection A). The Shapiro-Wilk test showed that both statistics did not have a normal distribution. The non-parametric two-sample Mann-Whitney U test was used to test the hypothesis. Statistical analysis of the 2017/18 season revealed that the mean value of points scored in home games μ_H was higher than in away games μ_A (U = 36,808; p < 0.00001). It was also found that in the 2017/18 season, the mean value of the number of goals scored in home matches μ_H was higher than in away matches μ_A (U = 34,412; p < 0.00001). Table 4 and 5 show the results of the Mann-Whitney U test for both statistics for all seasons. From the data in Table 4 and 5, it can be seen that statistically significant differences were observed for both selected statistics in all seasons. In the 2020/21 season, which was most affected by the COVID-19 pandemic, the mean score in home games μ_H was still higher than in away games μ_A (U = 51,939; p = 0.00633). Also, the mean value of the number of goals scored in home matches μ_A was higher than in away matches (U = 51,687; p = 0.01035). However, there is a slight increase in p-values for both variables. In the 2022/23 season, which was played without any restrictions, the mean score in home games μ_H was higher than in away games μ_A (U = 43,248; p = 0.00165). Also, the mean value of the number of goals scored in home matches μ_H was higher than in away matches μ_A (U = 42,676; p = 0.00165). However, the results of descriptive statistics indicate an increase in the p-values for both variables. Thus, the results show that home advantage was maintained even in games with spectator restrictions. Thus, spectator support in stadiums may not be the only reason for home advantage. The next section of the paper will discuss other potential factors.

Table 4
Results of Mann-Whitney U test for the 2017/18 to 2022/23 seasons – number of points

Season	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Test statistic U	36,808	49,652.5	48,212.5	51,939	47,876.5	43,248
p-value	< 0.00001	< 0.00001	< 0.00001	0.00633	< 0.00001	0.00165

Table 5
Results of Mann-Whitney U test for the 2017/18 to 2022/23 seasons – number of goals

Season	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Test statistic U	34,412	46,526	46,746.5	51,687	46,946	42,676
p-value	< 0.00001	< 0.00001	< 0.00001	0.01035	< 0.00001	0.00563

Discussion

The statistical analysis performed showed the existence of statistically significant differences between home and away matches in the Czech top football league and was in line with both traditional analyses and some more recent studies of football leagues in Europe. Both traditional research (e.g. Courneya & Carron, 1992; Nevill & Holder, 1999; Clarke & Norman, 1995; Pollard, 1986) and some more recent analyses (e.g. Reade et al., 2021; Cueva, 2020; Scoppa, 2021) share the view that home teams benefit from the presence of a home crowd, although this advantage was greatly reduced in the COVID-19 pandemic. The discussion around the extent to which this affects team performance outcomes (goals scored and points gained) during the COVID-19 pandemic is somewhat convoluted. For example, Tilp and Thaller (2020) and Hill and Van Yperen (2021) argue that home advantage is strongly dependent on the presence of fans, as the number of points, goals and shots on target for home teams is significantly reduced during the COVID-19 pandemic. On the other hand, Wunderlich et al. (2021) conclude that home advantage persists unchanged even in the absence of spectators. A likely reason is the heterogeneity of the studies, e.g., a number of games prior to COVID-19, number of leagues included, number of years in which home advantage effects are examined, or a choice of performance variables.

According to Pollard (1986), home advantage is primarily reflected in team performance, including points, goals, and dominance on the field. This method of quantifying home advantage is widely accepted and has been validated by numerous authors, such as Goumas (2013) and Pollard (1986). It is commonly used for a full playing season where teams play both home and away games. The results obtained from descriptive statistics confirm similar results by Dilger and Vischer (2020), which revealed a weakened home environment effect for the German Bundesliga during COVID-19. Thus, the research is consistent with the finding of McCarrick et al. (2021) that teams scored more points in home than away matches during the COVID-19 pandemic, but the difference was not as pronounced as in seasons with spectators. Home teams scored more goals than away teams, but this advantage diminished when the crowd was absent. The results of the Mann-Whitney U test demonstrate the existence of a statistically significant difference in points and goals between home and away matches. Home advantage was maintained even in matches with spectator restrictions, which is consistent with the findings of Wunderlichet al. (2021), Matos et al. (2021) and Ramchandani and Millar (2021).

One of the limitations of the present study was that the COVID-19 pandemic affected each season differently. The most stringent restrictions were only in place for the 2020/21 season and even then 36 games were played with specta-

tors. Other variables should be included in future studies (e.g. possible reduction in referee bias in the absence of spectator pressure, number of red and yellow cards, limited player selection by coaches due to athlete illness), especially if there is a clear reduction in home advantage, which has not yet been demonstrated. Other factors that may have influenced home advantage such as the unusual characteristics of the home stadium have not been taken into account in this analysis. Future research could take into account the capacity of individual stadiums. For example, the football club SK Slavia Prague was granted an exemption and could play with a full stadium despite very strict COVID restrictions. The research did not consider the relationship between stadium capacity and audience attendance. Various factors influence spectator attendance, such as the team's current performance, regional tradition and history, and the economic situation of the population. Attendance varied for each team in each season studied. During seasons without spectator restrictions, stadiums across the entire Fortuna:League were filled to an average of 53%. The range for individual teams' stadiums was from 16% to 80%.

It is unclear from the examined data whether the matches were solely affected by spectator restrictions. It is possible that some teams had an easier home schedule during the COVID-19 pandemic, which could bias the comparison of home-field advantage between seasons. During the COVID-19 pandemic, temporary rules were introduced regarding the number and timing of substitutions in matches, which may have impacted tactics. Additionally, it is possible that the presence of COVID-19 changed the players' behaviour, causing them to avoid close contact. It is important to note that both home and away teams did not have spectator support. During the COVID-19 pandemic, some foreign football competitions played sound in stadiums to replace spectator cheering. However, this trend has not been introduced in the Czech Republic yet. The COVID-19 pandemic had an impact on the matches due to several factors, including increased player sickness and quarantine measures. Additionally, players had to undergo regular COVID-19 testing and follow strict hygiene protocols. These factors may have affected the overall performance of the players.

The research presented is limited to Fortuna:League matches, which means that other matches in lower and football leagues may have behaved differently. There is an assumption that different results can be expected from lower football leagues with lower spectator attendances. The research presented is limited to the top football league in five seasons and further research needs to be conducted in other seasons and other leagues or countries in Central Europe so that the findings can be generalised to a wider population.

Conclusion

The main aim of the research was to determine whether there is home advantage in the top Czech football league and whether the COVID-19 pandemic had an impact on this advantage. The present research using the non-parametric two-sample Mann Whitney U test examines the differences between the number of points scored and goals scored in home and away matches. The research results show that home and away matches played with or without spectator restrictions in the 2019/20 to 2021/22 seasons were not statistically significantly different from matches played without restrictions. Thus, home advantage persisted even with spectator restrictions, albeit to a lesser extent.

Home advantage in football is one of the most researched factors in this sporting discipline. According to many authors (Pollard & Pollard, 2005; Jamieson, 2010; Leite & Pollard, 2018), the influence of home environment is much higher compared to other sports. However, the Czech football environment has not been statistically examined yet. It is for this reason that research on home advantage in the football environment needs to be given significant attention. It should be considered e.g. before betting odds. Home advantage in football is a thing that every bettor should consider before placing a bet.

STATEMENT OF ETHICS

This study was conducted in accordance with the World Medical Association Declaration of Helsinki. The study protocol was reviewed and approved by the *Ethics Committee of the Technical University of Liberec, Liberec, Czech Republic*. All participants provided written informed consent to participate in this study

DECLARATION OF CONFLICTING INTERESTS

The author declared no potential conflicts of interests with respect to the research, authorship, and/or publication of the article *Home advantage in the Czech football league before, during and after the COVID-19 pandemic.*

FUNDING

The author received no financial support for the research, authorship, and/or publication of the article *Home advantage in the Czech football league before, during and after the COVID-19 pandemic.*

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