

Influence of the video assistant referee (VAR) on the Brazilian Men's Soccer Championship

YURI NATHAN FERREIRA MENEGUITE¹; LUCIANO BERNARDES LEITE²; DAVI CORREIA DA SILVA³; ANSELMO GOMES DE MOURA⁴; VICTOR NEIVA LAVORATO⁵

^{1, 3, 4, 5} Governador Ozanam Coelho University Center (UNIFAGOC), Ubá-Minas Gerais, BRAZIL.

^{2, 5} Exercise Biology Laboratory. Department of Physical Education. Federal University of Viçosa. Viçosa, BRAZIL.

Published online: April 30, 2022

(Accepted for publication April 15, 2022)

DOI:10.7752/jpes.2022.04108

Abstract:

Introduction: Football is the most practiced sport in the world and one of the fundamental elements for the sport are the referees and assistants. Recently, the video assistant referee (VAR) was introduced in football in order to assist referees in the decision-making process during the game. In this way, VAR is used to minimize referee errors and promote fairer competition between teams. Objective: The objective of the present study was to analyze the influence of VAR in the 2019 Men's First Division Brazilian Football Championship, compared to the 2018 edition, in which VAR was not present. Methods: A descriptive analysis of the refereeing performance of all matches of the Brazilian Men's Football Championship, editions 2018 and 2019, was carried out, analyzing the number of penalties, fouls, yellow and red cards, offsides and goals per match. In addition, VAR actions were taken into account in the 2019 edition, including penalties, offsides, red cards and player recognition. It is noted that most of the analyzed plays concern penalties, followed by offsides, red cards and player recognition. The data was collected through SofaScore football statistics website (www.sofascore.com), this data is accessible free of charge. Results: It was found that most of the analyzed plays are related to penalties, followed by offsides, red cards and player recognition. There was a reduction in the average number of fouls, yellow cards and impediments per game in the 2019 Brazilian Men's Football Championship, compared to 2018. Conclusion: The use of VAR can influence arbitration sanctions in the Brazilian Football Championship and, consequently, the dynamics about the game.

Key Words: Football. VAR. Influence. Arbitration. Brazil.

Introduction

Soccer is the most practiced and popular sport in the world. In it, players, coaches, and referees have crucial roles to play during the game. The referee has the role of exercising laws and regulations that must be respected during the match (Cipriano, 2015). Porém, durante as partidas de futebol os árbitros são frequentemente criticados e questionados pelos jogadores, treinadores, mídias esportivas e demais membros da comissão técnica por alguma decisão tomada por eles durante o jogo (Rightheto & Reis, 2017). Thus, in recent years football has gone through a period of innovation, several technological resources have been inserted into the sport with the aim of minimizing referee errors and reducing their influence on the final result of the game (Spitz et al., 2020; Tamir & Bar-eli, 2021). One of these resources was Video Assistant Referee (VAR) which was implemented in the sports environment to assist referees in the decision-making process during matches.

The VAR began to be implemented in soccer in 2016, and the first World Cup organized by the Fédération Internationale de Football Association (FIFA) to use this tool was in 2018, having a large team of video assistant referees in the sixty-four matches. Altogether, the team comprises the chief referee of the VAR and his three assistants (AVAR1, AVAR2 and AVAR3), all of whom are members of the FIFA referee team (FIFA, 2020a). Due to its importance, in recent years several studies have been dedicated to verifying the influence of VAR in several football championships around the world, in addition to seeking to verify its acceptance in the sport (Samuel et al., 2020; Lago-Peñas, Rey & Kalén; Boschilia & Júnior, 2021; Errekagorri et al., 2021; Fişne, Bardakçi & Hasaan, 2021; Guler & Polat, 2021; Kolbinger & Knopp, 2021; Spitz et al., 2021; Oliveira et al., 2021).

The purpose of the VAR is to analyze the decisions made by the referee using video images and headphones for communication. However, the review of the moves is limited to the following situations: goals (fouls at the origin of the play, offsides, ball crossing or not the goal line or if the ball leaves the field of play during the play), penalties, red cards and player recognition (FIFA, 2020b). According to video referee protocol, in a mistaken move, once the video is reviewed by the VAR, the head referee is notified, and the decision is made together (Lago-Peñas, Rey & Kalén, 2019). The implementation of the VAR can be understood as an aid

to the refereeing team in a soccer match, since many moves are corrected for small details, because without this help mistakes often occurred.

It has been observed, with the arrival of the VAR, an increase in added time in the first half and in the whole game. Furthermore, the implementation of this tool led to a decrease in the number of fouls and yellow cards, in addition to showing that players have controlled themselves more in relation to aggressive actions in fouls (Lago-Peñas, Rey & Kalén, 2019).

As soccer progresses, the referee's task becomes more and more important to the game's dynamics (Cruz, 2012). Players sometimes question the decisions made by the referee, with refereeing errors causing aggressive behavior (Reynes, et al., 2008). In view of the work on the playing field of these agents, the responsible structures have tried to increase the quality of their training to improve their capabilities (Sarmiento, Marques & Pereira, 2016; Cruz et al., 2018). With the constant evolution of technology in some sports such as basketball, volleyball and tennis, the arrival of the VAR in soccer came to help refereeing.

The Brazilian Men's First Division Soccer Championship is the most important soccer competition in Brazil. In this competition, the VAR's performance began in the 2019 season. Considering this, this study analyzed the influence of the VAR in the 2019 Brazilian Men's First Division Soccer Championship, compared to the 2018 edition, in which there was no VAR present.

Material & methods

Sample

The sample consisted of 1520 games (760 matches of the Brazilian Championship and 2018 and 720 matches of the Brazilian Championship of 2019). The plays analyzed by VAR in the 2019 Brazilian Men's Football Championship season were analyzed, the year in which VAR was implemented in Brazil, with a total of 145 plays in 760 games.

Data collection

Data was collected through SofaScore football statistics website (www.sofascore.com). These data are freely accessible and were collected to obtain the number of penalties per match, fouls, yellow and red cards, offsides and goals per match. The names of the players or teams that made up the championship were not mentioned at any time during the work.

Statistical analysis

Data were presented as mean and standard deviation or simple percentage. To compare data from the Brazilian Men's Football Championship, 2018 and 2019 editions, a Kolmogorov-Smirnov normality test was initially performed. After verifying the normal distribution of data, Student's t test was used. The significance level adopted was $p < 0.05$. All analyzes were performed using the GraphPad Prism 8.1® statistical program.

Results

Figure 1 shows the data reviewed by the video referee (VAR) in the 2019 Brazilian Men's Soccer Championship. It is noted that most plays reviewed concern penalties (44.82%), followed by offsides (37, 93%), red cards (15.86%) and player recognition (1.39%).

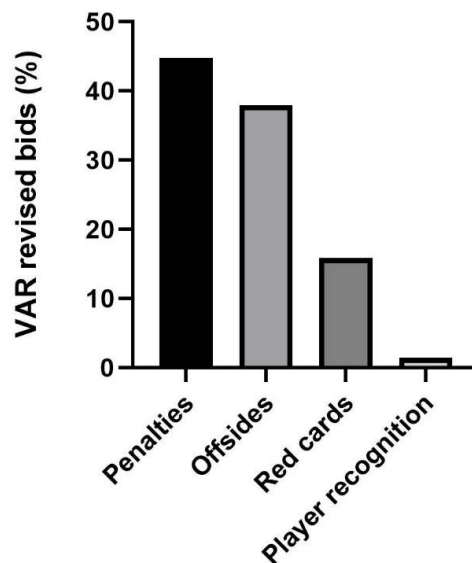


Figure 1. Percentage of plays reviewed by the VAR in the 2019 Brazilian Soccer Championship.

Figure 2 shows the comparison between the average of penalties, fouls, yellow and red cards, offsides and goals scored in the 2018 and 2019 editions of the Brazilian Men's Soccer Championship. No difference was observed for the penalty kick mean ($p = 0.1201$) (Figure 2A). The number of fouls ($p = 0.0002$) and yellow cards ($p = 0.0044$) was lower in the 2019 edition (Figure 2B and 2C). There was no difference for the mean number of red cards ($p = 0.7976$) (Figure 2D). The number of impediments was lower in the 2019 edition ($p = 0.0419$) (Figure 2E). There was no difference for the average of goals scored per match ($p = 0.2245$).

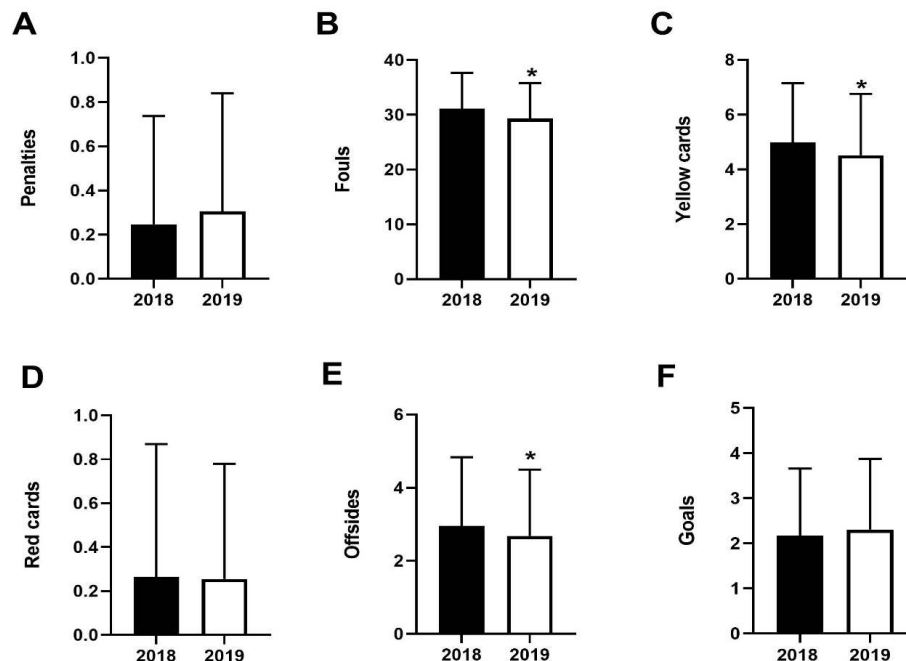


Figure 2. Mean and standard deviation of Penalties (A), Fouls (B), Yellow cards (C), Red cards (D), Offsides (E) and Goals (F) registered in the 2018 and 2019 editions of the Brazilian Soccer Championship. *, difference from the 2018 edition.

Dicussion

This study analyzed the impacts of the VAR on the 2019 Brazilian Soccer Championship, compared to the 2018 edition, in which there was no VAR presence. The main findings show that the 2019 Brazilian Men's Football Championship had fewer fouls, yellow cards, and impediments, compared to the 2018 edition. It is also noteworthy that among the plays analyzed by the VAR, penalties and impediments are the most reviewed.

As is well known, the VAR is a tool to reduce doubts in soccer. In this sense, it was seen that in the Premier League® (first division of the English Soccer Championship) the number of uncertainties has been reduced in the last 50 years by the evolution of the sport (Haugen, 2019). Therefore, the VAR contributes to an even greater reduction of possible uncertainties within the playing field. It is noted that the interference provided by the VAR, as happened in the 2019 Brazilian Championship, can interfere in the dynamics of the soccer game. Errekagorri et al. (2020) carried out a survey when none, one or two/three VAR actions occurred. The authors found that the more VAR interferences occur, the greater the total playing time.

In the present study, it was observed that the greatest number of interferences indicated by the VAR concerns the possible marking of penalties and offsides. In fact, they are the moves that can most generate doubts for referees and assistants, occurring very quickly in some situations. However, a strong and significant correlation has already been seen between the referee's performance and that of the referee + VAR for disciplinary actions and application of the laws of the game (Carvalho et al., 2020).

Regarding penalties, they were the actions that most occurred involving the VAR, therefore, the ones that can generate more conflicts to be signaled, considering that they can decide the winner and loser of the match and/or championship. It is important to note that even with the high number of VAR interferences in penalty shots, there was no difference in the average of goals per match, results that are in line with those obtained by Fernandes Júnior (2018), who analyzed all the VAR's revised bids in the World Cup 2018 with a total of 20 plays, 15 of which are related to penalties.

Offsides are in the second position of the plays most reviewed by the VAR in the 2019 Brazilian Championship. The current FIFA recommendations recommend that assistant referees wait for the completion of the play to signal an offside and, in case of doubt, the VAR's evaluation is recommended, to avoid harmful actions for any of the teams. The study carried out by Delfim and Jesus (2011) aimed to prove that it is

not possible to accurately indicate the offside move since the assistant referee does not always have the necessary field of vision for an accurate indication, which may explain the great performance of the VAR in offside moves.

In national championships such as the German (Bundesliga®) and the Spanish (La Liga®), it has been observed that the number of faults and card applications has been reduced after the introduction of the VAR (Hollander, 2020). Added to this, the study by Lago-Peñas, Rey and Kalén (2019) compared editions of the Bundesliga® and the Italian Football Championship (Serie A®) before and after the insertion of the VAR. The authors demonstrated that the number of yellow cards and fouls were significantly reduced. The reduction in the number of fouls and cards can be explained by the fact that the player becomes less aggressive because of the VAR technology. This system can assist in the review of throws of fouls and protests, causing players to reduce aggressive attitudes. Corroborating these data, this study shows that the average number of fouls and yellow cards per game was lower in the 2019 edition of the Brazilian Championship.

It was found that the average number of offsides per game marked in the 2019 Brazilian Championship was lower compared to the 2018 edition. Research by Han, et al. (2020) and Lago-Peñas, Rey and Kalén (2019), who evaluated the Chinese Soccer Championship, Bundesliga® and Serie A®, respectively, agree with our findings, showing a reduction in the number of offsides. Oudejans, et al. (2000) showed that assistant referees are positioned outside the offside line in 86.5% of the occasions, which can increase the chances of error. As the possibility of an error indicating an offside to occur is great, soon there are reviews and these can be marked or canceled, interfering with the final average.

There was no difference in the average of penalties per game, despite a trend towards an increase in markings in the 2019 edition. The VAR helps in the investigation of simulation plays and possible penalties, with a greater number of revisions in this regard being possible. It was found that after the implementation of the VAR in the Chinese Soccer Championship, there was a significant increase in the number of penalties awarded (Han, et al., 2020).

The study has the limitation of not comparing editions before 2018 and after 2019 of the Brazilian Men's Soccer Championship, which could further consolidate the results obtained. However, the 2020 and 2021 editions of the Brazilian Championship, due to the COVID-19 pandemic, had the dynamics of the championship changed, especially with the absence of fans in most of the games, which would be another factor to be analyzed.

Conclusions

It is concluded that the use of the VAR can influence arbitration sanctions in the Brazilian Soccer Championship and, consequently, the dynamics of the game. The main plays reviewed were penalties and offsides. In addition, the parameters changed in the 2019 Brazilian Soccer Championship edition were the number of fouls, yellow cards and offsides.

In practical terms, it should be noted that VAR is an extremely new tool in the current scenario of Brazilian football, so further studies should be carried out in order to identify how this tool influences games. In addition, the tool must be constantly evolving so that all the benefits provided by the tool are achieved and that the game dynamics is not influenced.

Disclosure Statement

No potential conflict of interest was reported by the authors.

References:

- Boschilia, B., & Júnior, W. M. (2021). O VAR na perspectiva dos 5E's: possibilidades de compreensão do futebol contemporâneo. *Lecturas: Educación Física y Deportes*, 26(282), 2-16. <https://doi.org/10.46642/efd.v26i282.2957>
- Carvalho V, Esteves PT, Nunes C, Araújo, D., Helsen, W.F., Travassos, B. (2020). Observe and make a call: football referee's assessment is context sensitive. *International Journal of Performance Analysis in Sport*, 20, 982-993. <https://doi.org/10.1080/24748668.2020.1820194>.
- Cipriano, P. G. D. C. L. (2015). Avaliação da performance do árbitro de futebol 11: Estudo de caso (Doctoral dissertation). Unpublished Master's thesis - Universidade de Lisboa Faculdade de Motricidade Humana, Lisboa.
- Cruz, G.P.R., Macha, A.A., Tertuliano, I.W., Oliveira, V. (2018). O árbitro de futebol e a importância dos aspectos psicológicos: olhares da psicologia do esporte. *Caderno de Educação Física e Esportes*, 16(1), 269-279.
- Cruz, P.M.C. (2012). Tomada de decisão do árbitro de futebol de primeira categoria (Unpublished Master's thesis, Universidade de Lisboa) Faculdade de Motricidade Humana, Lisboa.
- Delfim, T. F.; Jesus, V. L. B. (2011). O problema da simultaneidade na lei do impedimento do futebol. *Revista Brasileira de Ensino de Física*, 33(4), 4308-4308. <https://doi.org/10.1590/S1806-11172011000400008>.
- Errekgorri, I., Catellano, J., Etxezarra, I., Lago-Peñas, C. (2020). The effects of the Video Assistant Referee system (VAR) on the playing time, technical-tactical and physical performance in elite soccer.

- International Journal of Performance Analysis in Sport, 20(3), 808-817.
<https://doi.org/10.1080/24748668.2020.1788350>
- Fernandes Júnior, R. Participação do árbitro de vídeo (VAR) na copa do mundo da FIFA de 2018. (Unpublished monograph, Universidade Estadual Paulista “Júlio de Mesquita Filho”) Faculdade de Ciências, São Paulo.
- FIFA (2020a). Video Assistant Referees (VAR) /on-line/. Retrieved March 19, 2020 from: <https://footballtechnology.fifa.com/en/media-tiles/video-assistant-referee-var/>.
- FIFA (2020b). VAR at the World Cup /on-line/. Retrieved March 19, 2020 from: <https://footballtechnology.fifa.com/en/innovations/VAR-at-the-World-Cup/>.
- Fişne, M., Bardakçi, S., & Hasaan, A. (2021). Analysis of Perceptions of Turkish Fans of Video-Assistant-Referees in Elite Soccer. *South African Journal for Research in Sport, Physical Education and Recreation*, 43(2), 29-46.
- Gürler, C., & Polat, V. (2021). Video Assistant Referee's Effect on Football: Turkish Super League Case. *RBFF-Revista Brasileira de Futsal e Futebol*, 13(52), 118-124.
- Han, B., Chen, Q., Lago-Peñas, C., Wang, C., Liu, T. (2020). The influence of the video assistant referee on the Chinese Super League. *International Journal of Sports Science & Coaching*, 15, 662-668.
<https://doi.org/10.1177/1747954120938984>.
- Haugen, K. (2019). Video assisted refereeing in association football-possible adverse effects on uncertainty of outcome. *OA Journal-Sports*, 1, 1-3. <https://doi.org/10.24294/sp.v1i1.176>.
- Hollander N. (2020). The Impact of VAR on the Elite Game of Soccer. (Unpublished doctoral dissertation, Haverford College). Department of Economics, Haverford.
- Kolbinger, O., & Knopp, M. (2020). Video kills the sentiment—Exploring fans’ reception of the video assistant referee in the English premier league using Twitter data. *PloS one*, 15(12), e0242728.
<https://doi.org/10.1371/journal.pone.0242728>.
- Lago-Peñas, C., Rey, E., & Kalén, A. (2019) . How does Video Assistant Referee (VAR) modify the game in elite soccer? *International Journal of Performance Analysis in Sport*, 19, 646–653.
<https://doi.org/10.1080/24748668.2019.1646521>.
- Oliveira, M. A. C., Dambroz, F., Santos, R., & Moniz, F. (2021). VAR implementation and soccer team performance: a comparison between the 2014 and 2018 World Cups. *Journal of Physical Education and Sport*, 21, 3208-3213. <https://DOI:10.7752/jpes.2021.s6426>.
- Oudejans RRD, Verheijen R, Bakker FC, Gerrits, J.C., Steinbrückner, M., Beek, P.J. (2000). Errors in judging ‘offside’ in football. *Nature*, 404: 33-33.
- Reynes, E., Canovas, S., Ferrand, C., Pantaleon, N. (2008). Consequências emocionais dos erros de arbitragem em jogadores de futebol: estudo exploratório. *Revista Psicologia & Sociedade*, 20(1), 5-15.
<https://doi.org/10.1590/S0102-71822008000100002>.
- Righeto, C., & dos Reis, H. H. B. (2017). Os árbitros de futebol e a mídia esportiva: a interpretação de árbitros paulistas sobre os comentários da mídia acerca do trabalho da equipe de arbitragem. *Movimento*, 23(1), 281-294.
- Samuel, R. D., Galily, Y., Filho, E., & Tenenbaum, G. (2020). Implementation of the video assistant referee (VAR) as a career change-event: The Israeli premier league case study. *Frontiers in Psychology*, 11, 564855. <https://doi.org/10.3389/fpsyg.2020.564855>
- Sarmento, H.M., Marques, A., Pereira, A. (2016). Representações, estímulos e constrangimentos do árbitro de futebol de 11. *Motricidade*, 11 (4), 15-25. <http://dx.doi.org/10.6063/motricidade.3496>.
- Spitz, J., Wagemans, J., Memmert, D., Williams, A. M., & Helsen, W. F. (2021). Video assistant referees (VAR): The impact of technology on decision making in association football referees. *Journal of Sports Sciences*, 39(2), 147-153. <https://doi.org/10.1080/02640414.2020.1809163>
- Tamir, I., & Bar-eli, M. (2021). The moral gatekeeper: Soccer and technology, the case of Video Assistant Referee (VAR). *Frontiers in Psychology*, 11(613469), 1–7. <https://doi.org/10.3389/fpsyg.2020.613469>