



Ciencia y Deporte

Volume 9 issue 2; 2024





Assessment of the psychological impact of the use of video assistant referee (VAR) in soccer refereeing

[Valoración de las incidencias psicológicas del uso del arbitraje por video (VAR) en el arbitraje del fútbol]

[Avaliação das incidências psicológicas da utilização da videoarbitragem (VAR) na arbitragem de futebol]

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Received: 04/12/2023

Accepted: 24/01/2024

ABSTRACT

Introduction: every day information and communications technology contribute to the work of different areas of sports refereeing, in the particular case of soccer, video assistant referee (VAR) helps the decision-making process in four situations that determine the outcome of matches. However, also has a psychological impact on this, as it is in a constant process of evaluation.



Objective: to assess the relevance of an alternative for identifying the psychological impact of the use of VAR in Ecuadorian soccer refereeing.

Materials and methods: empirical theoretical and mathematical statistical methods and techniques were used in the research; where the starting point was a descriptive and predictive study.

Results: once the results of the consultation with the specialists in the convened areas were tabulated, it was possible to appreciate that the alternative presented is viable and pertinent to be applied in social practice.

Conclusions: the results obtained demonstrate a high level of validity, since they were obtained through the application of the scientific method.

Keywords: soccer, sports pedagogy, refereeing, psychological, alternatives.

RESUMEN

Introducción: cada día la tecnología de la información y las comunicaciones contribuyen al trabajo de diferentes áreas del arbitraje deportivo en el caso particular del fútbol el arbitraje por video (VAR) ayuda al proceso de toma de decisiones en cuatro situaciones determinantes para el resultado de los partidos. Sin embargo, también incide psicológicamente en este, pues está en un constante proceso de evaluación.

Objetivo: valorar la pertinencia de una alternativa para la identificación de la incidencia psicológicas del uso del VAR en el arbitraje del fútbol ecuatoriano.

Materiales y métodos: en la investigación se utilizaron métodos y técnicas teóricas empíricas y matemáticas estadísticas; donde se parte de un estudio descriptivo predictivo

Resultados: una vez tabulados los resultados de la consulta a los especialistas de las áreas convocadas, se pudo apreciar que la alternativa presentada es viable y pertinente para ser aplicada en la práctica social.

Conclusiones: los resultados obtenidos demuestran un alto nivel de validez, pues se obtuvieron mediante la aplicación del método científico.



Palabras clave: fútbol, pedagogía deportiva, arbitraje, psicológicas, alternativas.

RESUMO

Introdução: a cada dia a tecnologia da informação e comunicação contribui para o trabalho de diferentes áreas da arbitragem desportiva, no caso particular do futebol, a videoarbitragem (VAR) auxilia o processo de tomada de decisão em quatro situações determinantes para o resultado dos jogos. Porém, também tem impacto psicológico sobre ele, pois está em constante processo de avaliação.

Objetivo: avaliar a relevância de uma alternativa para identificar o impacto psicológico do uso do VAR na arbitragem do futebol equatoriano.

Materiais e métodos: na pesquisa foram utilizados métodos e técnicas teóricas empíricas e matemática estatística; onde partimos de um estudo descritivo preditivo

Resultados: tabulados os resultados da consulta aos especialistas das áreas conveniadas, percebe-se que a alternativa apresentada é viável e relevante para ser aplicada na prática social.

Conclusões: os resultados obtidos demonstram alto nível de validade, pois foram obtidos através da aplicação do método científico.

Palavras-chave: futebol, pedagogia esportiva, arbitragem, psicológico, alternativas.

INTRODUCTION

The new information and communications technologies (ICT) have transformed the performance of various processes and environments of daily life activity, but also in science, academia and sports.

Based on the arguments raised above, the referee has had to adapt to the continuous evolution of sport. From prehistoric times, when activities such as dances or hunting rituals began to be practiced, to the present day, where there are a multitude of



disciplines, there has been a need for a figure to watch over the good practice of these activities.

Before delving into the state of the art of this topic, it is important to define what a sports referee is, and for this purpose, we turn to the *Real Academia Española* (English: Royal Spanish Academy of Language) (2015), which defines it as: "Action or faculty of refereeing". In turn, it defines the verb arbitrate as: "To act or intervene as a referee, especially in a conflict between parties or in a sporting competition" PP-27.

It is in this last field of action that this research will focus on, since the introduction of these devices has even led to a change in the rules and procedures of sports. In the case of soccer, the introduction of the Video Assistant Referee (VAR) has changed the refereeing activity.

Several authors have argued the characteristics of VAR in soccer refereeing. Among them, stand out (Gómez, *et al.*, 2019; Ramírez, Zaldívar, Gordo, Pérez, López, Núñez, and Rodríguez, 2020; Muñoz, *et al.*, 2022; Garrido, 2022; Tuninetti, 2022; Serrano, 2022; Morocho, Navarro and Fernández, 2022). All agree that these are the ones that are generally summarized.

- Review of key decisions: VAR is used to review key decisions of the main referee, such as goals, penalties, red cards and player identification errors.
- Video assistant referee team A video assistant referee team, composed of a video assistant referee (VAR) and several assistant video assistant referees (AVARs), reviews controversial plays through replays from different angles.
- Instant communication: There is instant communication between the main referee on the field and the video assistant referee team, allowing for quick and accurate decision making.
- Use of technology: Different technologies, such as high-speed cameras and real-time replays, are used to evaluate game situations in detail.



- **Protocols for use:** There are specific protocols on when and how the VAR should be used. Typically, it is used in situations where there is a "clear and obvious error" or "a serious undetected situation."
- **Review of plays on the monitor:** In some leagues, the main referee has the option of reviewing controversial plays on a sideline monitor to make a final decision.
- **Transparency in Communication:** In many cases, communication between the main referee and the video assistant referee team is broadcast through the stadium loudspeakers or explanations are provided via television broadcast to improve transparency.
- **Avoiding Injustices:** The main objective of VAR is to correct erroneous decisions and avoid situations of injustice, guaranteeing that the result of the match accurately reflects the development of the game.

All these changes have generated additional concern for referees in different leagues and championships. These changes, when carried out in a sustained manner, have important psychological implications that can generate stress in the referees during the match.

Among the main implications are the following:

Additional pressure: referees may feel additional pressure due to the knowledge that their decisions may be reviewed and corrected by VAR; public exhibition. VAR review of plays is done in a public manner and is often shown on giant screens in stadiums. Referees may feel exposed and subjected to the scrutiny of the public, players, coaches and media and relief or frustration, depending on the situation. A ruling that was initially misinterpreted may be corrected through VAR, generating relief. On the other hand, the review can generate frustration if the original decision is upheld and is controversial. Aspects that have been systematized by authors such as (Garrido, 2022).

This is why, at present, the scientific community has explored this issue in depth from some angles. Such is the case of authors such as (Cantón, Gistain, Checa, and Eva, 2011). Those who delved into a psychological mediation program with soccer referees. Which



have important actions. However, they do not clarify how to do it in a methodologically way as an alternative for the use of the VAR.

On the other hand, (González and Dosil, 2004). They proposed a group of psychological characteristics of soccer referees in the Galician Autonomous Community. These were used as a guideline for the present research.

To assess this situation, a factual diagnosis was carried out on 25 referees from different leagues in Ecuador. A survey was applied to them and 15 matches were observed where those involved in the study performed. This allowed us to identify a group of limitations that hinder this issue, which are summarized as follows:

- There are manifestations of anxiety and stress at the possibility of being publicly corrected during a controversial play.
- Lack of knowledge on what activities to develop to mitigate the psychological impacts related to the use of VAR in soccer refereeing.
- Insufficient use of alternatives for the identification of the psychological impact of the use of VAR in the Ecuadorian soccer refereeing.

Based on the above, the following research problem is identified: How to mitigate the psychological incidents related to the use of VAR in soccer refereeing?

In order to solve the problem, the following objective is formulated: to assess the relevance of an alternative for the identification of the psychological impact of the use of VAR in the Ecuadorian soccer refereeing.

To follow the course of the research, the following research questions are presented:

- What are the theoretical and methodological foundations of the psychological implications of the use of VAR in soccer refereeing?
- What characteristics should an alternative for the identification of the psychological impact of the use of VAR in the Ecuadorian soccer refereeing have?



- What results will be obtained from the theoretical assessment of the proposed alternative?

In order to solve the questions presented above, the following research tasks are presented:

- Identification of the theoretical and methodological foundations of the psychological impact of the use of VAR in soccer refereeing.
- Elaboration of an alternative for the identification of the psychological incidences of the use of VAR in the Ecuadorian soccer refereeing.
- Assessment of the relevance of the proposed alternative

MATERIALS AND METHODS

For the present research, the postulates of non-experimental research were taken into account, since there was no manipulation of variables during the development of each of the research phases taken into account. In addition, a descriptive-predictive type of research was carried out. The consultation of specialists in the areas of refereeing, psychology and sports pedagogy, generated the prediction about the possibility of applying of the alternative presented.

The study also used theoretical, empirical and mathematical statistical methods and techniques. Which were contextualized to the characteristics of the research and its objective.

Theoretical:

Analytical-synthetic and induction-deduction: They were used during the consultation process for the critical assessment of the literature on VAR, sports refereeing and psychology, specialized documentation, in the application of other methods of scientific



knowledge, in the results obtained in the diagnosis. These allowed the theoretical platform of the present research.

Empirical:

Documentary review: Provided the necessary information on the current state of the identification of the psychological incidents of the use of VAR in the Ecuadorian soccer refereeing.

The survey of the specialists consulted in the areas of refereeing, psychology and sports pedagogy, in order to assess the criteria issued regarding the alternative for the identification of the psychological impact of the use of the VAR in the Ecuadorian soccer refereeing.

Specialists' criterion: it was used to identify the level of relevance of the alternative for the identification of the psychological effects of the use of VAR in the Ecuadorian soccer refereeing.

Mathematical statistics:

Descriptive statistics were used, particularly the absolute and relative frequency distribution, where each of the results of the survey question and the Likert scale elaborated are analyzed.

In addition, the Pearson Correlation coefficient was used to determine the level of relationship between the answer given by the specialists to each of the survey questions. The statistical processor SPSS for Windows version 20.0 was used for this purpose.

The research sample consisted of 20 specialists in the areas of soccer refereeing, psychology and sports pedagogy. All of them had more than 10 years of professional experience, with professional degrees and were working in these areas at the time of the present study. All gave their informed consent to participate in the study and received all the information about it (Table 1).



Table 1. - List of specialists according to their degree, specialty and years of experience

Number	Qualification	Specialty	Years of experience
1-	Bachelor's degree	Pedagogy: physical activity.	21
2-	Master's degree	Psychology	23
3-	Bachelor's degree	Pedagogy: physical activity.	26
4-	Bachelor's degree	Referee	20
5-	Master's degree	Pedagogy: physical activity.	21
6-	Bachelor's degree	Pedagogy: physical activity.	10
7-	Bachelor's degree	Referee	13
8-	Ph.D.	Physical culture sciences	29
9-	Bachelor's degree	Pedagogy: physical activity.	13
10-	Master's degree	Psychology	19
11-	Master's degree	Pedagogy: physical activity.	21
12-	Bachelor's degree	Pedagogy: physical activity.	12
13-	Ph.D.	Physical culture sciences	31
14-	Bachelor's degree	Referee	11
15-	Bachelor's degree	Psychology	10
16-	Bachelor's degree	Referee	16
17-	Bachelor's degree	Referee	12
18-	Master's degree	Psychology	21
19-	Master's degree	Psychology	20
20-	Ph.D.	Physical culture sciences	38

The research presented has the following phases:

First phase: the first phase consisted of the introduction with the study of the theoretical foundations of the psychological effects of the use of VAR in the Ecuadorian soccer refereeing, which are used indistinctly in the research.

Second phase: the alternative for the identification of the psychological incidences of the use of VAR in the Ecuadorian soccer refereeing is elaborated.

Third phase: specialists are consulted according to the scale and research techniques used, the results are tabulated and presented.



RESULTS

This section begins with a summary of the alternative for the identification of the psychological incidence of the use of VAR in the Ecuadorian soccer refereeing. It shows some scientific criteria on the alternative as a scientific result. Its structure and schematic representation (Figure 1). Some of the implications of the VAR are detailed and some of the activities contained in the alternative developed in this research are also shown.

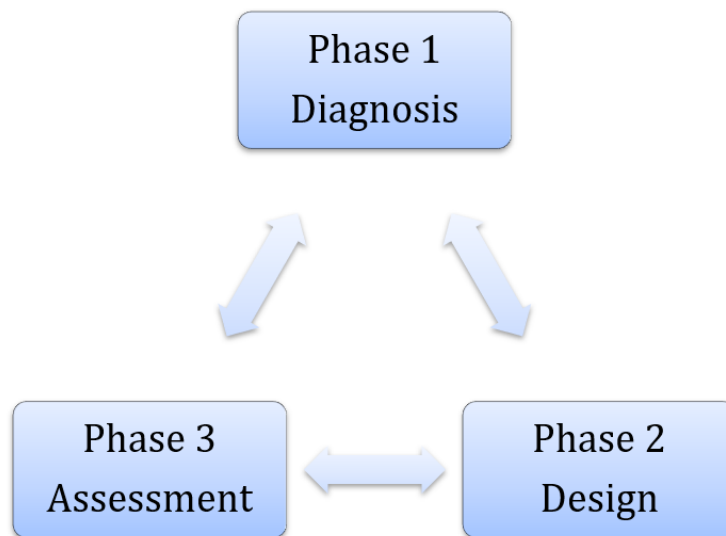


Fig. 1. - Schematic representation of the alternative developed

The alternative presented is based on an objective, which in this case is oriented to assess the psychological impact of the use of VAR in the Ecuadorian soccer refereeing. It is divided into three phases: the first is a diagnostic phase in which a theoretical search of the background research on the subject is conducted and the state of the art is prepared, then the FIFA normative documents are reviewed and finally a survey is applied to a group of experienced soccer referees.

In the second phase, the psychological effects related to the use of VAR in soccer refereeing are identified and a set of activities are designed as a way to counteract the effects of VAR on these important decision makers in soccer matches.



The third phase involves a consultation with specialists with experience in the subject, where they are sent the alternative and a survey on its relevant aspects with their respective liker scale where they must issue their assessment.

Some of the possible psychological impacts related to the use of VAR in soccer refereeing:

- Tendency to manifestations such as anxiety and stress: the anticipation of the VAR review and the possibility of being publicly corrected can generate anxiety and stress in referees. This emotional factor can affect their ability to concentrate and make accurate decisions.
- Increased cognitive load: the need to process additional information from the VAR can increase the cognitive load on referees. This affects their ability to handle multiple tasks and make quick decisions on the field.
- Impact on the relationship with players and coaches: VAR intervention can generate frustration and discontent among players and coaches, which affects the relationship between them and the referees. Emotional management and conflict management skills become critical.
- Need to adapt: Referees may need to psychologically adapt to a change in game dynamics due to the use of VAR. This involves adjusting their mental and emotional approach to manage the new demands associated with technology.
- Implications on the perception of fairness: The perception of fairness in the game may change, as some decisions may be perceived as more fair or unfair after the VAR review. This may affect the satisfaction and attitude of players, coaches and fans.

Example of proposed activities for the identification of psychological incidences related to the use of VAR in soccer refereeing

1- Analysis of emotional reactions:



- It is essential that referees participate in a self-assessment exercise. After reviewing a situation with the VAR, they should describe their emotions and reactions.
- Individual interviews should be conducted to delve deeper into emotional experiences and how they affected their decision making.

Virtual simulations:

- Simulations of VAR situations in virtual environments should be used to recreate the pressure and decision-making under the constant gaze of the cameras.
- Observe and analyze the emotional and cognitive responses of the referees during these simulations.

2- Perception surveys:

- Surveys are applied to collect referees' perception of the psychological pressure associated with the use of VAR.
- Questions on stress, confidence in decisions made with the VAR and perception of external criticism are included.

3- Mental training:

- Implement mental training programs to help referees manage the stress and psychological pressure associated with the use of VAR.
- Include breathing techniques, positive visualization and mindfulness in the training.

4- Group sessions:

- Organize group sessions for referees to share their experiences and discuss strategies for handling psychological pressure.
- A sports psychologist can facilitate these sessions to provide guidance and support.



5- Long-term follow-up:

- Conduct long-term follow-up to evaluate the impact of psychological interventions and mental training.
- Adjust strategies as necessary to address the changing needs of referees.

Results of the consultation with specialists

A Likert scale with three options (very adequate (5), somewhat adequate (3) and not adequate (1)) was used for the present research. These will be illustrated in correspondence with each of the three questions of the survey of specialists. For better understanding, bar graphs are shown with each of the data and it ends with the application of the Pearson Correlation coefficient to validate the results of this research (Figure 2).

Question 1. How do you evaluate the structure of the alternative elaborated in this research?

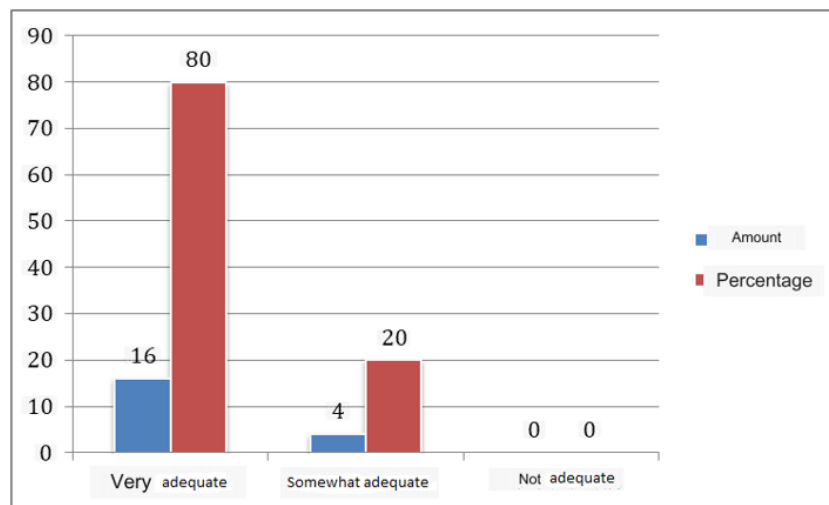


Fig. 2. - Results of question 1 of the survey

After tabulating the data obtained from the consultation with specialists in question 1, a graph with the same number was constructed to summarize the results. These make evident the level of relevance of the structure of the alternative presented. Most of the



professionals consulted (16 for 80%), revealed that it was very adequate. On the other hand, the rest (4 for 20 %), granted it the somewhat adequate category. It is necessary that none of those consulted revealed that the structure of the alternative was not adequate.

Question 2. How do you evaluate the content of the alternative elaborated in this research?

The results of this question are similar to those obtained in the previous one and are displayed in figure 3. Which shows that most of the specialists consulted gave it the category of very adequate, as shown by the fact that 14 of them, for 70 % selected this option in the survey. On the other hand, although there was a described increase in this option, the results are still satisfactory, since only six, for 30 %, were in favor of this option. As in the case of the previous question, it is worth noting that it did not score in the lowest category of the scale designed (Figure 3 and Figure 4).

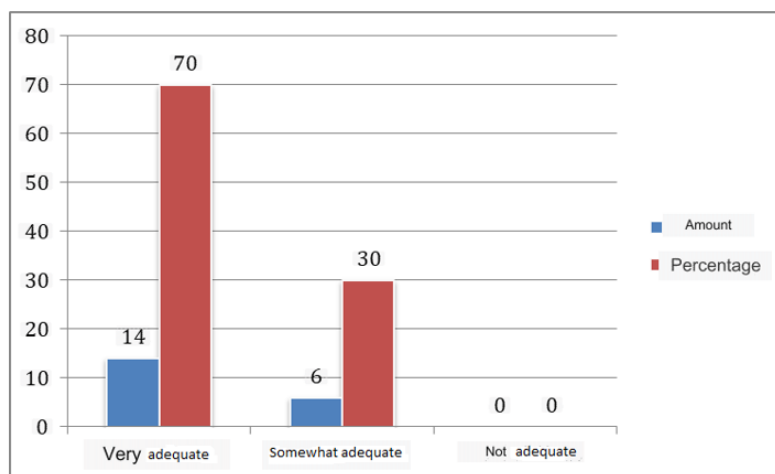


Fig. 3. - Results of question 2 of the survey

Question 3. How do you evaluate the possibilities of applying the alternative elaborated in this research?

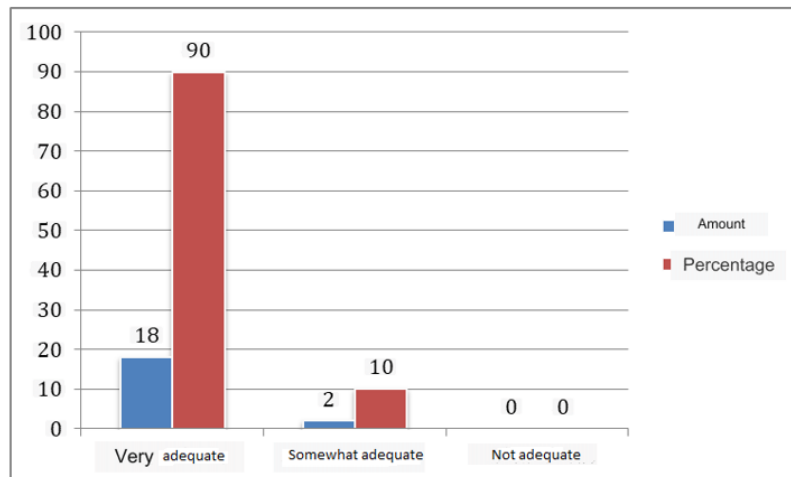


Fig. 4. - Results of question 3 of the survey

The results in the figure correspond to those of the same question number in the survey. It is necessary to state that this question was the one that obtained the highest score, the highest category of the scale designed. This reveals the possibilities of application of the alternative developed in the present research.

The aforementioned was reflected in the fact that 18 of the professionals represented 90% of the total sample under study. Revealed that it was very adequate to the aspect valued. On the other hand, only two (10 %) gave it the criterion of somewhat adequate and none of these gave it the category of not adequate.

The results obtained reveal the level of relevance of the alternative for the identification of the psychological impact of the use of VAR in the Ecuadorian soccer refereeing. In each of the questions consulted, the majority of the members of the sample gave it the highest rating.

Validation of results

In order to deepen the validity of the results, a correlation study was carried out, since it shows the relationships between three variables, that is, the degree of possibility of coincidence between them. Table 2 presents the correlation matrix between the variables corresponding to the contents of the three questions of the survey applied to the



professionals involved in the research. For this purpose, the values of the scale shown above were assigned.

Once the data had been processed with the SPSS statistical program for Windows version 20, the correlation coefficients calculated for all the possible pairs of variables in the study. This statistical analysis was carried out using the Pearson test, where the results were considered significant at r , ($p < 0.005$). All of the above makes evident the level of significance obtained by the results of this research, thus demonstrating the high degree of internal validity presented by the research (Table 2).

Table 2. - Results of the Pearson Correlation test

		Structure	Exercises	Recommendations
Structure	Pearson correlation	1	,901 **	,844 **
	Sig. (bilateral)	-	0.00	0.00
	N	15	15	15
Exercises	Pearson correlation	,901 **	1	,941 **
	Sig. (bilateral)	0.00	-	0.00
	N	15	15	15
Recommendations	Pearson correlation	,844 **	,941 **	1
	Sig. (bilateral)	0.00	0.00	-
	N	15	15	15

** . Correlation is significant at the 0.01 level (bilateral).

Source: processed with the SPSS statistical package for Windows version 20.

DISCUSSION

In the specialized literature there are some authors who have systematized this topic, among them stand out authors such as Muñoz, *et al.* (2022), these authors delved into the effect of the soccer referee's experience in sports competition. They recognize the topicality and novelty of the research topic, however in their proposal they did not delve into the psychological effects of the use of VAR in soccer refereeing. This is where the main difference with our study lies.



On the other hand, Garrido, (2022). Carries out a research in order to assess the impact of VAR on the disciplinary sanctioning bodies of professional soccer in Spain. These postulates were an important theoretical and methodological basis. However, it does not make clear what to do to mitigate the psychological manifestations.

It is worth highlighting the studies of Arjona *et al.* (2022), as they delve into the effect of the soccer referee's experience in the sport competition. These aspects are considered to be positive, since in the opinion of the authors of this research, expertise is an important means of mitigating the psychological manifestations of the use of the VAR.

Researchers Lendoiro, and Acero, (2022), make an assessment of professional soccer. Without equality until the Effective Playing Time (EPT) is established and the dimensions of the field are homogenized. In our opinion, these results are an important basis for adequate psychological stability in the management of the VAR.

CONCLUSIONS

The determination of the theoretical and methodological foundations addressed in the present study made it possible to determine the state of the art of this topic and thus demonstrate the need for an alternative for the identification of the psychological impact of the use of the VAR in the Ecuadorian soccer refereeing.

Based on the background studies, the professional experience of the authors and the results of the factual diagnosis, the relevance of an alternative for the identification of the psychological impact of the use of the VAR in the Ecuadorian soccer refereeing was assessed.

The results obtained from the consultation with the specialties allow us to identify the alternative proposal for the identification of the psychological incidences of the use of the VAR in the Ecuadorian soccer refereeing. It is pertinent and presents possibilities of being applied in sports practice.



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Conflict of interest statement:

The authors declare having competing interests.

Author contribution statement:

The authors have participated in the redaction of the manuscript and the documentary review.



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