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The Effect Of Physical Fatigue on Football Referee's Decision Making

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Abstract

The referee has a crucial role in presenting professional football games. Mistaken decisions may have a profound impact on the outcome of the match. Research is required to determine the aspects influencing referee decisions to avoid mistaken decision-making. This research aims to determine the effect of fatigue experienced by referees on decision-making. This research used an experimental method with 16 football referees as the sample. The research instrument was a video test of football referee decision-making from UEFA 2022. The results of this research reveal a significant influence of fatigue experienced by referees on decision-making. Referees' stamina has a significant impact on referees' decision-making.

Keywords: *Football referee, Physical fatigue, Referee's decision.*

INTRODUCTION

Football is the most popular sport globally and is played with varying skill levels regardless of gender, social status, or climate. Football is familiar among people with different backgrounds and ancestry, a bridge connecting economic, political, cultural, and religious levels (Luxbacher, 2013). Football performance depends on various factors such as technical/biomechanical, tactical, mental, and physiological areas. In sports teams in the open field, such as football, several roles must be fulfilled, such as players, coaches, and referees (Catteeuw et al., 2009; Bennike et al., 2014; Nurcahyo et al., 2021). In every football match, the role of the referee is very significant, especially in professional football. A wrong decision may profoundly influence the match's outcome (Castagna et al., 2017; Syafi'i & Setiawan, 2019).

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Many possibilities cause the referee's performance to be less than optimal in officiating a match. One of the causes of referee performance not being optimal on the field could be declining physical condition. Referees not in prime condition when officiating matches certainly experience problems displaying their best performance. Decreased physical condition can cause a referee to tire quickly. Fatigue will continue to increase while work performance will decline (Purwata, 2015; Giriwijoyo, 2020)). It indicates that the fatigue experienced will interfere with a person's performance. The fatigue of the referee will decrease concentration level, so the possibility of producing mistakes in decision-making is increased. To ensure that football matches run well and correctly, referees and assistant referees combine high-speed running activities with low-intensity activities during the match (Castagna et al., 2007).

Several incidents on the field show that mistakes made by referees repeatedly emerge in the final minutes of crucial time in a match. Referee errors are common when deciding on an incident from a distance of 11–15 m (Mallo et al., 2012). Mistakes that arise may have a big impact on the match's outcome. In the 2021 Indonesian league, problems have arisen several times due to mistakes made by the referee in the final minutes, which directly impacted the match result. By that minute, referees are generally tired because they have been carrying out their work duties for approximately 80-90 minutes and have covered a distance of 8-10 km.

Currently, minimal research still examines aspects of physical fatigue experienced by referees. Researchers are currently still more interested in studying aspects that influence athlete performance. Based on the problem phenomena above and the lack of research on the influence of physical fatigue on football referee decision-making, researchers need to determine the impact of fatigue on football referee decision-making.

METHOD

The method used in this research is an experimental method involving 16 football referees. The referees first conduct an initial decision-making test using the UEFA Referee Video Test 2022. The test carried out by the referee consists of 20 videos about the referee's decisions from each incident in the video. After obtaining data about the initial test, the referee is assigned intervention.

The intervention was physical activity through a bleep test until the

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samples felt tired. To detect fatigue experienced by referees, researchers used the Forerunner 935 smartwatch, which was produced in 2017 by Garmin, a watch manufacturer from the United States. This watch is used to control the referees' pulse during physical activity. After carrying out maximum physical activity with the pulse rate measured on the watch, the referees perform a decision-making test as a post-test. The results obtained from the pre-test and post-test were then calculated statistically using the paired sample t-test to see whether the referees experienced an influence of fatigue on their decision-making.

RESULT

After carrying out a series of tests and providing physical activity interventions to provide a fatigue effect on the football referees sampled in this research, the data needed in this research was obtained. The data obtained was based on preliminary and final tests by researchers on 16 football referees, as shown in Table 1.

Table 1. Referee Decision Test

Pengambilan Keputusan	*N*	*Minimum*	*Maximum*	*Mean*	*Std. Deviation*
Pre Test	16	30	70	54.06	9.67
Post Test	16	35	60	48.43	7.46

Table 1 shows the results of the decision-making test via the UEFA video test during the pre-test and post-test. From the pre-test results, the lowest score obtained by the referees was 30, and the highest score was 70 out of a total maximum score of 100. Meanwhile, the average score in the pre-test was 54.06. The decision-making test results data was obtained from the post-test results, with the highest score being 60 and the lowest score being 35, while the average score on the post-test was 48.43. The data in Table 1 shows a difference in the average of the pre-test and post-test, where the post-test score is lower than the post-test score. It shows the influence of the fatigue intervention on the referee's decision-making. However, further tests need to be carried out to determine the significance of the fatigue felt by the referees.

Before carrying out a significance test, it is necessary to carry out a preliminary test to see normallity of data distribution. After carrying out the normality test, the results (Table 2) show that the pre-test and post-test data are normally distributed. It can be

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noticed from the pre-test significance value, 0.253, and the post-test value, 0.465. The pre-test and post-test have a significance value greater than 0.05, so both data are declared normally distributed.

Table 2. Normality test

	Shapiro-Wilk		
	Statistic	Df	Sig.
PRE-TEST	.931	16	.253
POST-TEST	.948	16	.465

Table 3. Paired Samples Test

		Mean	Std. Deviation	Sig. (2-tailed)
Pair 1	PRE TEST - POST TEST	5.62500	6.29153	.003

After comprehending the data normality distribution, a significance test was carried out using the paired sample test to determine the effect of physical fatigue on the decision-making of football referees. In Table 3, the data obtained after the paired sample test shows a significance value of 0.003. The value obtained is smaller than 0.05, so it can be concluded that physical fatigue significantly influences football referees' decision-making.

DISCUSSION

The results of this study reveal a significant influence of physical fatigue on football referee decision-making. In line with several studies conducted on athletes in several sports, physical fatigue can interfere with sports performance. In football, physical fatigue can interfere with skill performance throughout the match (Russel et al., 2011; Herdiles & Komarudin, 2017). The fatigue that arises in football referees is almost identical in football athletes because referees have almost the same power range as players in the midfield position. Even in modern football, a referee can cover a distance of 10-12 km in one match (Castillo et al., 2016).

The decline in referee performance in making decisions due to physical fatigue is related to concentration, so it is challenging for referees to make the right decisions, even though the referee must be able to make the right decision in a relatively short time. This fatigue phenomenon is defined as a reduced capacity for maximum performance (Knicker et al., 2011) and the inability to complete tasks that have been achieved quickly (Halson,

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2014). When playing a real match, the referee must be close to every incident on the field to make the right decision.

Fatigue experienced by the referee will certainly reduce the referee's speed in moving closer to the incident scene, which will also affect the accuracy of the decisions made by a football referee, identical to the fatigue that arises in athletes. More specifically, there is a decrease in the speed and accuracy of skills caused by perceived fatigue (Kellis et al., 2006).

This study also found that the decline in athletes' performance did not appear excessively striking when regarded from the average difference. It is possible due to the fatigue of the referees, even though the pulse rate monitored via the smartwatch is not optimal. In fact, in a real football referee match, the referee has to run 7.5 to 11.5 km in one match, with an average heart rate intensity of 85 – 95 HRmax (Mallo et al., 2009). It can certainly be a consideration for further research so that more sophisticated real-time tools to monitor pulse rates can be used.

More appropriate physical activity interventions to the referee's physical activity during the match are also needed, with a duration adjusted to the duration of the referee's physical activity on the field. Another aspect that is no less significant is that future research can utilize a larger sample of referees to obtain a wide variety of data, which can deepen the research results later.

CONCLUSION

This research shows the impact of physical fatigue experienced by football referees on the decisions taken by these referees. The main finding is that the aspect of fatigue experienced by referees in this study is that physical fatigue significantly influences football referees' decision-making. It proves that a referee must be able to maintain their condition to remain in maximum condition during the match

. Maximum physical strength influences appropriate and correct decision-making.

REFERENCE

Bennike, S., Wikman, J. M., & Ottesen, L. S. (2014). Football Fitness – A New Version of

https://doi.org/10.20884/1.paju.2023.5.1.9986
e-ISSN : 2686-5807 | p-ISSN : 2686-5793

Football A Concept for Adult Players in Danish Football Clubs. *Denmark: Scandinavian Journal of Medicine & Science in Sport Volume 24 Number 1*.

Castagna, C., Abt, G., & D'Ottavio, S. (2007). Physiological aspects of soccer refereeing performance and training. Sports medicine, 37(7), 625-646.

Castagna, C., Bizzini, M., Póvoas, S. C. A., & D'Ottavio, S. (2017). Timing effect on the training-session rating of perceived exertion in top-class soccer referees. International journal of sports physiology and performance, 12(9), 1157-1162.

Castillo, D., Yanci, J., Casajús, J. A., & Cámara, J. (2016). Physical fitness and physiological characteristics of soccer referees. Science & Sports, 31(1), 27-35.

Catteeuw, P., Helsen, W., Gilis, B., & Wagemans, J. (2009). Decision-making skills, role specificity, and deliberate practice in association football refereeing. Journal of Sports Sciences, 27(11), 1125-1136.

Giriwijoyo, S., Ray, H. R. D., & Sidik, D. Z. (2020). Kesehatan, olahraga, dan kinerja. Bumi Medika.

Halson, S. L. (2014). Monitoring training load to understand fatigue in athletes. Sports medicine, 44(Suppl 2), 139-147.

Herdiles, D. H. C., & Komarudin. (2017). Improving the value of fitness testing for football. *IOP Conf. Series: Materials Science and Engineering*, *180*, 1–5. https://doi.org/10.1123/IJSPP.2013-0453

Kellis, E., Katis, A., & Vrabas, I. S. (2006). Effects of an intermittent exercise fatigue protocol on biomechanics of soccer kick performance. Scandinavian journal of medicine & science in sports, 16(5), 334-344.

Knicker, A. J., Renshaw, I., Oldham, A. R., & Cairns, S. P. (2011). Interactive processes link the multiple symptoms of fatigue in sport competition. Sports medicine, pp. 41, 307–328.

Luxbacher, J. A. (2013). Soccer: Steps to success. Human Kinetics.

Mallo, J., Navarro, E., Aranda, J. M. G., & Helsen, W. F. (2009). Activity profile of top-class association football referees in relation to fitness-test performance and match standard. Journal of Sports Sciences, 27(1), 9-17.

Mallo, J., Frutos, P. G., Juárez, D., & Navarro, E. (2012). Effect of positioning on the accuracy of decision making of association football top-class referees and assistant referees during competitive matches. Journal of Sports Sciences, 30(13), 1437-1445.

Nurcahyo, P. J., Kusnandar, K., Budi, D. R., Listiandi, A. D., Kurniawati, H., & Widyaningsih, R. (2021). Does Physical Fitness Correlate with IQ? A Study among Football Student Athletes. *Jurnal Pendidikan Jasmani Dan Olahraga*, *6*(2).

Purwata. (2015). Kelelahan dan recovery dalam olahraga. *Jurnal Pendidikan Kesehatan*

https://doi.org/10.20884/1.paju.2023.5.1.9986
e-ISSN : 2686-5807 | p-ISSN : 2686-5793

Rekreasi, *1*, 2–13.

Russell, M., Benton, D., & Kingsley, M. (2011). The effects of fatigue on soccer skills performed during a soccer match simulation. International journal of sports physiology and performance, 6(2), 221-233.

Yeap, E. E. L., Mokhtar, R., Muslimen, M. A., Ghazali, F., & Tarmizi, M. A. A. (2016). Outdoor-Based Education Camp: An Essential Tool to Promote Leadership Skills. *International Journal of Information and Education Technology*, *6*(5), 352–356. https://doi.org/10.7763/IJIET.2016.V6.713

Syafi'i, I., & Setiawan, A. (2019). Koordinasi Mata Dan Kaki Pada Long Passing Sepak Bola. *Physical Activity Journal*. https://doi.org/10.20884/1.paju.2019.1.1.1993

https://doi.org/10.20884/1.paju.2023.5.1.9986
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