

Improvements in Primary Emergency Care Understanding during Matches for Football Coaches and Referees in East Java

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Abstract Improper initial management of emergency conditions during football matches causes long-term morbidity, affects the athlete's future performance, and may be life-threatening. Football coaches and referees may come from non-medical backgrounds, but they should understand how to provide primary care in emergency situations during matches. This program aims to improve the primary emergency care understanding of the coaches and referees in East Java. The program was conducted in September 2022 – January 2023. All referees, assistant referees, and coaches of the Football Association of the Indonesia (FAI) region East Java (128 participants) were included. The primary emergency care training material consisted of video, PowerPoint media, and hands-on mannequins. Participants were given pre-and post-test to assess their level of knowledge, with a passing grade 75. Comparative tests (Wilcoxon signed rank, McNemar, and Chi-square test) were used to analyze the data. The median of the pre-and post-test scores were 62.5 and 87.5. There was a significant difference between pre-and post-test scores ($p < 0.001$). There was no significant difference between coaches and referee groups in pre-test scores ($p = 0.743$). This program improved the primary emergency care understanding during matches of coaches and referees.

1. INTRODUCTION

Football is one of the most popular sports worldwide, including in Indonesia. It is a physical contact sport with a relatively high risk of injury for athletes. Injuries can occur during matches or training. Common serious injuries experienced by athletes during matches are head and neck trauma, concussions, facial fractures, trauma to the chest and abdomen, fractures, and dislocations (FIFA Medical Committee & FIFA Medical Assessment and Research Centre, 2015). Based on data from a systematic review conducted in 2019-2020, injuries in professional male football athletes range from 2.5 to 36 injuries/ 1000 hours of competition. It is ten times higher than during training. The most common injured body parts are the extremities or lower legs (60-90%) – such as injuries to the hamstring, ankle, knee, and groin areas (López-Valenciano et al., 2020; Owwoeye et al., 2020; Pangrazio & Forriol, 2016). Head and

neck injuries are the second most common injury experienced by football athletes. The incidence of concussion in a football match is 0.27 (95% CI 0.24 – 0.30) per 1000 injuries (Klein et al., 2018; Owwoeye et al., 2020; Pangrazio & Forriol, 2016).

Injuries that do not resolve completely will affect an athlete's career and quality of life. Foot, head, and neck injuries of a mild degree result in prolonged athlete rest periods, impairing the ability to join in competitions ranging from 2 to 17 days. Moreover, injuries to the anterior cruciate ligament in the knee may result in an athlete resting for approximately 185 – 256 days (Klein et al., 2018). Knee and ankle injuries are also associated with earlier retirement. These injuries also result in psychological burdens (depression) and social costs for athletes, their families, and society (Koch et al., 2021). Head and neck

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injuries and internal bleeding are rare but life-threatening injuries. Head and neck injuries can occur due to collisions with other players' heads (the most prevalent mechanism), other players' body parts (hands, feet), the field, or the goalposts. Acute complications from head and neck injuries are brain injury which can cause mortality.

On the other hand, one of the chronic complications due to head and neck injuries is early cervical spine degeneration. The concussion caused by collisions during matches needs special attention because it causes a reduction of the future performance and quality of life of the athlete (Mehnert et al., 2005; Mooney et al., 2020; Niedfeldt, 2011). In Indonesia, records regarding the incidence of head injuries and the short-term and long-term impacts of injuries are still limited. In addition to physical injuries, medical emergencies during matches have also received inadequate attention. Medical emergencies in a football match include cardiac arrest, non-traumatic chest pain, anaphylactic, bronchial spasms/asthma due to exercise, seizures, and hypoglycemia (FIFA Medical Committee & FIFA Medical Assessment and Research Centre, 2015). However, the incidence of medical emergencies is less common than physical injuries.

Emergency primary care is the main key to the athlete's recovery after injury during matches (Panchal et al., 2020). Appropriate emergency primary care can reduce the athlete's disability rate. After the recovery phase, it is hoped that the athlete's performance will return to the pre-injury condition and their achievements can be even better than before they were injured.

In many regions in Indonesia, medical teams in football matches are understaffed. This condition compromises the athlete's safety. All stakeholders involved in the field, such as referees, assistant referees, and team coaches, are expected to understand the proper primary emergency care. Coaches and referees can provide primary emergency care before the medical team arrives. Previous studies have proven that any lay person who witnesses incidents and can provide sufficient primary care may result in better outcomes for the injured athlete's condition (Panchal et al., 2020). Referees and coaches must know the indicators that the athlete can return to play or must be removed from the match to prevent further injuries (FIFA Medical Committee & FIFA Medical Assessment and Research Centre, 2015).

Based on mass media reports, at least five (5) Indonesian football athletes died due to head, neck, and limb collisions from 2000 to 2020, and two (2) of them are from East Java Region (Atmoko, 2021). This condition shows the importance of strengthening emergency primary care from stakeholders involved in football matches in East Java so that they can provide primary care from the time of injury until they arrive at the hospital appropriately.

This program aimed to improve coaches' and referees' emergency primary care understanding during football matches. Through this program, we hope that a better understanding of coaches and referees regarding primary emergency care during matches can prevent athlete morbidity and death and restore athlete performance to the

pre-injury conditions.

2. METHOD

This program was conducted from September 2022 to January 2023 in collaboration with the Football Association of Indonesia (FAI) – East Java Region. We organized training in emergency primary care in emergency conditions during matches. This training has been a responsibility program organized by the FAI East Java Region regarding the incidence resulting in athletes' mortality due to injuries while playing in matches (Atmoko, 2021). Referees, assistant referees, and coaches of the FAI East Java team who attended this training were the subjects of this study. This training presented material using video and PowerPoint media and hands-on mannequins. The material provided comprised emergency primary care for extremity trauma (legs and arms), immobilization, splints, head, and neck trauma, management of airway obstruction in unconscious victims, safe transportation, and cardiopulmonary resuscitation (CPR). These topics were chosen because they related to medical emergencies and injuries resulting from physical contact with players of the opposing team. Also, these topics are recommended by the FIFA Football Emergency Medicine Manual (FIFA Medical Committee & FIFA Medical Assessment and Research Centre, 2015). The subjects were presented by two instructors who were also the authors of this study. Participants were divided into groups of 8-10 people. Each group was taught by a co-instructor who had trained in primary emergency care during matches before this program was conducted. The duration of each training program was 3 hours. Before and after the training, participants were given eight multiple-choice questions to assess their level of knowledge (pretest and posttest). The passing grade for both pretest and posttest was 75. If the posttest score was less than 75, the participant repeated the posttest, but in the statistical analysis, we only included the first posttest score.

The data analysis in this study used the pretest and post-study design. The data in this study were presented as descriptive and inferential statistics. The paired t-test was used to assess differences in the pretest and posttest scores for normally distributed data and the Wilcoxon rank test for non-normally distributed data. McNemar and Chi-square tests were used to analyze the differences in the data distribution among groups. The test would be declared statistically significant if $p < 0.05$. Statistical analysis in this study was done using the SPSS 26.0 (IBM®) program.

3. RESULT AND DISCUSSION

3.1 Characteristics of the Participants

This program was conducted in three batches (September, November 2022, and January 2023) to limit the number of participants so that the teaching and learning atmosphere was conducive and there was sufficient time for hands-on for each participant. The first batch was referees and assistant referees. The second and third batches were

the football team coaches Figure 1.

The total number of participants was 128. About 57.8% (74 participants) were referees and assistant referees, and 42.2% (54 participants) were team coaches (Figure 2). Almost all the participants were male. There were three females or 2.3% of the total participants (just in the referee and assistant referee group).



Figure 1. Training in emergency management during matches: (a) hands-on session with football referees and assistant referees; (b) lecture session with football coaches

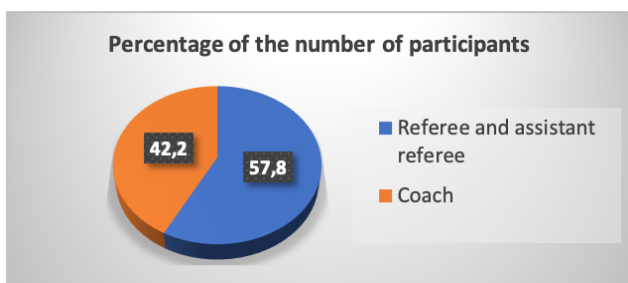


Figure 2. Characteristics of the participants

3.2 Pretest and posttest scores

The pretest and posttest scores are shown in Figure 3 and Figure 4. Both pre- and posttest scores were not normally distributed. An overall score is shown in Figure 3. The median of the pretest score was 62.5, with an interquartile range of 12.5. The lowest pretest score was 0.0, and the highest was 100.0. The median of the posttest score was 87.5, with an interquartile range of 12.5. The lowest pretest score was 25.0, and the highest was 100.0. From bivariate analysis using related-samples Wilcoxon signed rank test, there was a statistically significant difference between pretest and posttest scores with $p < 0.001$.

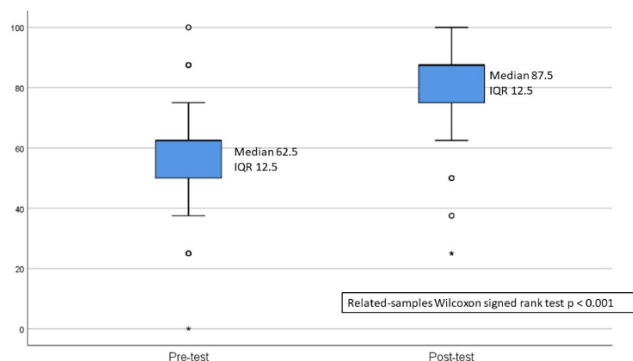


Figure 3. Pretest and posttest scores. IQR= Interquartile range

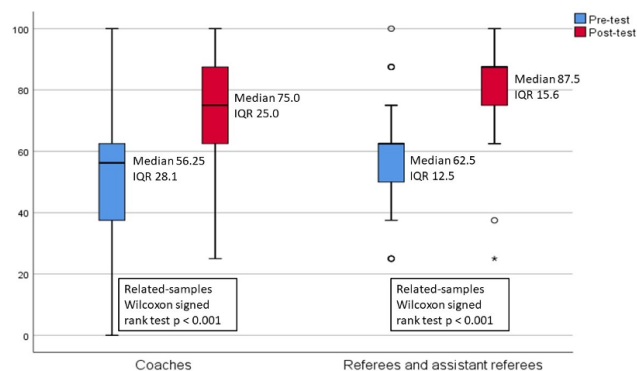


Figure 4. Pretest and posttest scores. IQR= Interquartile range

The coaches group had a lower median of the pretest and posttest scores than the referees and assistant referees' group (Figure 4). The interquartile range of the coaches group was greater than that of referees and assistant referees. Both groups had a statistically significant difference between pretest and posttest scores ($p < 0.001$).

In this study, we used 75 as a minimum passing score. The number of participants who passed the pretest was 29/128 (22.7%), whereas 99/128 (77.3%) did not pass (Table 1). The number of participants who passed the posttest was 104/128 (81.3%), whereas 24/128 (18.7%) participants did not pass. The participants who did not pass the posttest did the remedial posttest, and all of them reached a score of 75.

Table 1. Distribution of the pretest and posttest scores

	Posttest		Total	P
	< 75	> 75		
Pretest < 75	23	76	99	<0.001
Pretest > 75	1	28	29	
	24	104	128	

McNemar test, statistically significant if $p < 0.05$

Table 2. Distribution of the pretest score in coaches and referees group

	Pretest score		Total	P
	< 75	> 75		
Coaches	41	13	54	0.743
Referees and assistant referees	58	16	74	
	99	29	128	

Table 3. Distribution of the posttest score in coaches and referees group

	Posttest score		Total	P
	< 75	> 75		
Coaches	16	38	54	0.007
Referees and assistant referees	8	66	74	
	24	104	128	

The distribution of the pretest and posttest scores in both groups (coaches vs. referees and assistant referees groups) are shown in Table 2 and Table 3. There was no distribution difference in pretest score between the two groups ($p =$

0.743). However, there was a significant difference in the distribution of posttest scores between the two groups ($p = 0.007$). The number of participants in the coaches group who did not pass the minimum posttest score (16/54 or 29.6%) was higher than the referees and assistant referees group (8/74 or 10.8%).

3.3 Discussions

Based on the pretest and posttest results, the training improved the coaches' and referees' primary emergency care understanding. The group of coaches had an extensive range (IQR) of pretest scores compared to the referees and assistant referees group. This data also reflected a comprehensive range of previous knowledge in the coaches group. However, both groups had a good improvement in understanding after the training session.

A study in the United States of America (USA) by Chin et al. (2015) about the youth football coach's knowledge of first aid showed that the coach's knowledge still needed to be improved. Approximately 11% of coaches passed the online first aid assessment (FAA), and just about 20% of coaches with first aid and cardiopulmonary resuscitation certification passed the FAA. Although the sample size is quite similar to this study (114 vs. 128), the composition of the participants is different. Our study included football coaches, referees, and assistant referees, but Chin only included football coaches (Chin et al., 2015). These two studies concluded that football coaches need to understand the primary emergency care of injury and emergency conditions in athletes during matches. Another systematic review of the knowledge of coaches and officials in sports-related concussions (SRC) by Yeo et al. (2020) also showed that the knowledge of coaches and officials still needs improvement.

Further education about SRC is essential for coaches, officials, and athletes (Yeo et al., 2020). Therefore, a better understanding of primary emergency care will reduce the morbidity of the athlete who gets injured. These data also showed that certification and knowledge of first aid or emergency management need to be evaluated and refreshed periodically. Until this article was written, we cannot compare the results of this study with another study in Indonesia. We had not found a scientific article in Indonesia that discussed the level of primary emergency care knowledge of the stakeholders (coaches or referees) involved in football matches.

There are some limitations to our study. We assessed the coaches' and referees' primary emergency care understanding using pretest and posttest, not in real practice during matches. So, we did not evaluate the primary emergency skills of the participants.

4. CONCLUSION

This program improved the knowledge of football coaches, referees, and assistant referees in primary emergency care during matches. The coaches, referees, and official teams can also give the primary emergency care if the medical teams run out of staff. This study is able to show that

the emergency management knowledge of the coaches and referees involved during matches before this training program still needs to improve. We hope this program can be sustainable and implemented in another FAI region with a more comprehensive evaluation (knowledge and skill). We recommend that primary emergency care skills be a prerequisite for active referees, assistant referees, and coaches to be involved in a match. Good primary emergency care given to injured athletes reduces the athlete's morbidity and mortality.

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CONFLICT OF INTERESTS

There is no conflict of interest in this work. The manuscript submitted is an original study that has not been published before. All authors have read and approved this manuscript submission.

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