

Improving coaches and parents' knowledge and attitude towards sport sciences implementation: a community-based program in football schools (SSB) in Sleman



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ABSTRACT

Introduction: Many young athletes joined football schools (SSB) to gain and improve their skills, aiming to participate further in high-level competitions. However, most SSB management lacked comprehension of sports sciences, essential to support young athletes' growth and development and improved sports performance. This program aimed to improve coaches' and parents' knowledge and attitudes towards sports sciences and its implementation in SSB.

Methods: Involving representatives from 13 SSBs in Sleman, an integrated training on sports sciences comprising of long-term athlete development (LTAD), nutrition and psychological development for young athletes, coaching program, and management of SSB was carried out. Knowledge was measured before and after training using questionnaires consisting of multiple-choice questions (MCQ). A focus group discussion (FGD) was also conducted to assess participants' knowledge and attitudes about implementing sports sciences in SSB. Changes in knowledge scores were analyzed using the Wilcoxon Signed Rank Test.

Results: Thirty-five participants completed both pre-test and post-test, whereas only 17 participated in the FGD. The mean score during the post-test increased significantly by 12.71 points compared to the pre-test (74.29 vs. 61.58, $p < 0.05$) with increased passing rate (57.14% vs 25.71%). Individual's change in knowledge improved by 28.83%. As stated during FGD, participants believed in the benefits of implementing sports sciences on athletes' growth and development, health, well-being, and performance. They also believed in the possibility of implementation, considering the growing number of licensed coaches. However, the inhibiting factors might be a lack of capable human resources, funding, readiness, and knowledge. Fortunately, a few SSBs reported having partially implemented sports sciences, and all SSBs are willing to start implementing sports sciences by educating all involved parties regarding sports sciences.

Conclusion: These findings concluded the program's success and the promising possibility of sports sciences implementation in SSB.

Keywords: sport sciences; long-term athlete development; football schools, young athlete, football.

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INTRODUCTION

Football is a popular sport in the world as well as in Indonesia. The Indonesian National Football Team had outstanding achievements at the beginning of the independence period, but over time, there was a decline in their achievements. Coaching is necessary to improve sports performance starting early with a well-directed program.¹ Sports coaching at an early age can start from football schools

(SSB) in the regions. Football school management and proper coaching can prepare players to compete nationally and internationally.

The coaching of young athletes inevitably has various challenges. At an early age, adolescent athletes are still in a period of growth and development that needs special attention so that the process is not disturbed. Adolescence (13-18 years) is a period of significant physical growth and development, including

changes in body composition, metabolic and hormonal fluctuations, organ system maturation, and the formation of nutrient stores, which may affect future health.² Athletes have a risk of injury, so proper prevention and treatment are required to avoid disability. In long-term athlete development (LATD), children are introduced to the basics of the game and trained for practice to maximize enjoyment, fitness, and performance.^{3,4}

In sports sciences, the involvement of

various disciplines in the development of athletes plays an essential role in achieving optimal performance. Physiology, medicine (physical), psychology, and public health (nutrition) are health-related sciences that play a role in supporting performance.⁵ Comprehensive nutrition components affect athlete performance by 69.8%.⁶ Knowledge, intake, achievement, and adequate and optimal nutritional status must be met in the conditioning phase. However, practically, the implementation of the role of nutritionists as sports personnel at athlete development centers has not been optimal.⁷ The coach plays an essential role in the athlete's training program. In addition, the coach also plays a role in determining young athletes' motivation and emotional experience.⁸

Despite its importance, many SSBs in Sleman lacked knowledge of sports sciences, which further impacted their attitude toward its implementation in SSB. Therefore, this community empowerment program took place in the Sleman area in collaboration with the PSSI Sleman Regency Football Association (ASKAB). This program aimed to improve coaches' and parents' knowledge and attitude towards sport sciences implementation in SSB by providing education and training on the concept of sport sciences and its implementation.

METHOD

Population, sample, and study design

This study used a mixed-method design in all Football Schools (SSB) under the Sleman Regency Football Association (ASKAB). This research applied a total sampling technique; thus, all SSBs were invited to participate. The study participants were representatives of parents and coaches from all SSBs who completed either pre- and post-tests during training or Focus Group Discussion (FGD).

Design of the training program

The scope of this program included the application of sports sciences in the context of youth football athletes, focusing on three interdisciplinary fields of sciences, including physiology, nutrition, and psychology. The topics were delivered through an integrated training program

at the Office of the Regent of Sleman attended by coaches and parents from SSB over two days. On the first day, 23rd of July 2022, the training covered results from relevant research in sports sciences, emphasizing its translation into practice. Additionally, on the second day, 30th of July 2022, the training was wrapped up with supplemental topics on coaching and managerial skills that were considered essential for coaches and managers of SSB in the implementation of sports sciences. Each topic was presented by professionals with relevant academic disciplines for 30-50 minutes and finished with a short discussion after each topic between the speakers and participants. All topics were delivered with visualization aids through images and videos to help participants comprehend the materials. An FGD followed the training to discuss the topics delivered during the training further and evaluate participants' knowledge and attitudes regarding the implementation of sports sciences in SSB. The protocol of this study has been approved by the Medical and Health Research Ethics Committee (MHREC) at the Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada (reference number: KE/FK/1014/EC/2022).

Data collection

Pre- and post-test

Pre- and post-tests were employed to collect quantitative data. Participants were asked to answer several questions before and after the training program to assess their knowledge level. The instrument used was multiple-choice questions (MCQ), which comprised nine questions on sports sciences and six on coaching and managerial skills. Only data from participants who sat both the pre- and post-test progressed through the data analysis.

Focused Group Discussion (FGD)

Focused Group Discussion (FGD) was held after all integrated training sessions were completed to assess participants' knowledge and attitude towards sports sciences implementation. The FGD was conducted in groups of no more than 10 participants and led by a facilitator from one of the researchers. In addition to the recording session, a scribe was

also present to take notes. The facilitator read each question, and participants were welcome to present their arguments based on their perspectives and understanding. It was emphasized from the beginning that there were no right or wrong answers during the FGD session. The FGD was conducted for approximately 40 minutes using an instrument containing the following open-ended questions:

- 1) What do you think about sports sciences in athlete training and coaching? What components are considered part of sports sciences?
- 2) What are the benefits of applying sports sciences in young athletes' training and coaching?
- 3) Do you think your SSB has started implementing sports sciences? If so, which approach has your SSB implemented?
- 4) In your opinion, from the topics delivered during the integrated training, what practices can be implemented in your SSB? How would you implement them?
- 5) What are the enabling factors and possible barriers that have been or may be found in implementing sports sciences in your SSB?
- 6) How are the readiness and commitment of the management, coaches, athletes, parents, and other related personnel in implementing sports sciences in your SSB?

Data analysis

Descriptive analysis and normality tests were performed on pre-test and post-test quantitative data. A paired T-test for parametric data or Wilcoxon Signed Rank Test for non-parametric data was done to compare participants' pre-test and post-test scores. Passing percentage at pre- and post-test was determined with passing grade was set at points scored >75. Qualitative data was analyzed by first transcribing the recording from FGD into narration. Transcription was then analyzed by applying qualitative content analysis (QCA), and finally, it was reported using thematic analysis. Data saturation was concluded for each theme. Data triangulation and peer debriefing were conducted to ensure the trustworthiness of the data.

RESULT

Execution of program

The research was conducted in July 2022 at the Office of the Regent of Sleman and comprised two main activities: an integrated training program and a Focus Group Discussion (FGD). The first activity, the integrated training program, took place on the 23rd and 30th of July 2022, involving 35 participants who were parents and coaches from 13 SSB under the Sleman Regency Football Association (ASKAB). The topics covered during the training included the following titles: 1) physical activity, exercise, and fitness assessment in young athletes, 2) physiology of young athletes, 3) psychological perspectives of young athletes, and 4) management of nutrition for young athletes to support long-term athlete development (LTAD). The content was delivered by experts through lecture-style presentations using PowerPoint slides, followed by the speaker taking questions from participants. Pre- and post-tests were conducted to assess participants' knowledge levels before and after the training, enabling a comparison of their knowledge acquisition.

The Focus Group Discussion (FGD) took place on the 30th of July 2022. Only 17 participants from 12 SSB participated in the forum, while the others had to leave early due to personal agendas. All

participants were divided into two groups, with a trained facilitator and note-taker in each group. The facilitator opened the forum and began with each participant introducing themselves along with the name of the SSB they represented and their position before moving to the discussion

and finally wrapping up with a conclusion for each question.

Pre-test and post-test score

Knowledge was assessed before and after the training using questionnaires that consisted of multiple-choice questions



Figure 1. Integrated Training Program. (a) Pre-Test. (b) Delivery of topic from an expert.



Figure 2. Focus Group Discussion (FGD). (a) FGD Group A. (b) FGD Group B.

Table 1. List of participants from SSBs^a who take part in the program

No.	SSB ^a	Total Participants	
		Training Program	FGD ^b
1.	TUNAS MUDA SLEMAN	4	2
2.	BSA TAMA	3	1
3.	ANGKATAN MUDA TRIDADI	2	1
4.	BANGUNKERTO	5	2
5.	TUNAS MERAPI CANGKRINGAN	3	1
6.	BINA PUTRA JAYA	1	0
7.	BALAKOSA	4	2
8.	ANGKATAN MUDA SEYEGAN	4	3
9.	REAL MADRID FOUNDATION UNIVERSITAS NEGERI YOGYAKARTA	2	1
10.	MAGUWOHARJO PUTRA	2	1
11.	PESAT	2	1
12.	SATRIA SEMBADA	2	1
13.	GELORA MUDA	1	1
	TOTAL	35	17

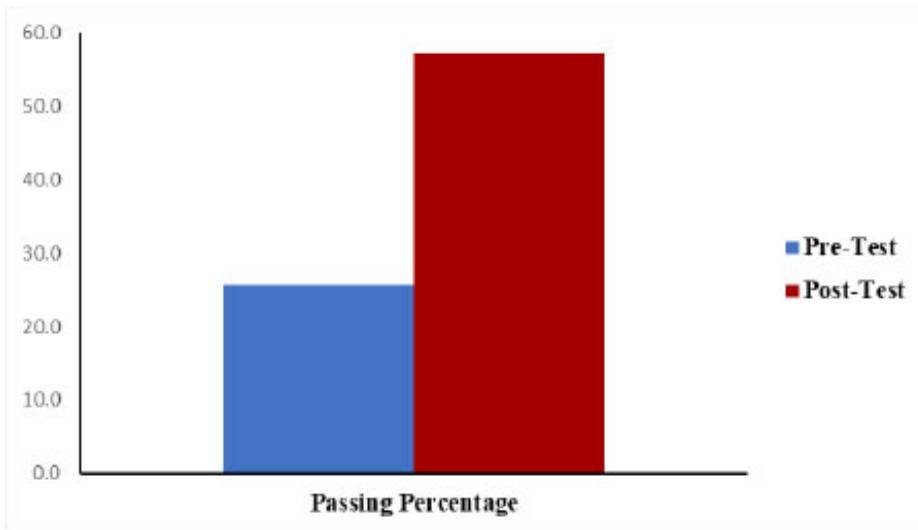
^aFootball School

^bFocus Group Discussion (FGD)

Table 2. The Mean Score Test Before and After Training

Variables	Mean±SD		Δ	p-value
	Pre-test	Post-test		
Score	61.58 ± 3.47	74.29 ± 2.93	12.71 ± 2.58	0.000*
% change in pre- and post-test score			28.81 ± 6.31	

*significant difference between pre- and post-test based on Wilcoxon Signed Rank Test

**Figure 3.** Percentage of participants achieving the passing standard (score > 75).

(MCQs). A total of thirty-five participants completed both the pre-test and post-test during the integrated training program. Based on Table 2, the mean pre-test score for the participants was 61.58±3.47, while the mean post-test score was 74.29±2.93. Subsequently, changes in knowledge scores were analyzed using the non-parametric Wilcoxon Signed Rank Test, as the data is not normally distributed. According to the analysis results, there was a significant difference between the pre-test and post-test scores ($p < 0.05$). It was found that the mean score during the post-test increased significantly by 12.71 points compared to the pre-test (74.29 vs. 61.58, $p = 0.000$). Furthermore, there was an increase in the passing rate (score > 75) in the post-test compared to the pre-test by 31.43% (57.14% vs 25.71%), while the mean individual's knowledge itself improved by 28.81%.

Definition of sports sciences

The perceptions of sports sciences, according to the FGD, were the implementation of multidisciplinary sciences, including sports medicine, sports nutrition, sports psychology, and sports biomechanics, in coaching athletes

to optimize athletes' performance (Table 3). This was reflected in the description two participants indicated,

"... the point is... psychology, physiology, and nutrition for athletes at a certain age..." (coach from group A).
 "... involving coaches, athletes, nutrition (especially about eating habits)... tactics and strategies... providing learning curriculum and steps for parents to support their children to improve their performance..." (parent from group B)

Benefits of sport sciences implementation

The study found that participants perceived the implementation of sports sciences beneficially as a guide for athletes' growth and development. Furthermore, it could shape and manage their athletic quality, optimize their performance, reduce the risk of severe injuries, and maintain their health (Table 3).

"... helping the team management to build and manage athletes' health and development..." (manager from group B)

"... it can improve the quality of children in sports to achieve certain

goals... particularly in the development of football playing" (parent from group B)

"... it helps to improve performance, also prevent injuries during exercise or match..." (coach from group A)

Sport Sciences Implementation in SSB Current implementation

As shown in Table 3, regarding the current implementation of SSB, participants stated that some SSBs tried to implement it but have not yet been fully implemented. Some SSBs indicated psychological, biomechanical, nutritional, medical, and/or coaching approaches. Examples of the actions applied were limiting athletes' consumption of junk foods, ensuring athletes' sleep quality, and limiting their gadget use.

"... to prevent dehydration... it is quite expensive if we use isotonic water... so we usually replace it by making ORS (Oral Rehydration Solution) to prevent dehydration..." (coach from group A)

"... once a week, we usually give them some food supplements ... such as milk or fruits..." (parent from group A)

"... implementing a healthy diet (reducing junk foods), getting enough rest, doing an outbound activity... to improve the sense of solidarity... and reducing the use of gadgets ..." (parent from group B)

"... we already collaborated with the sports-related college for developing our coaching system..." (coach from group B)

Plan of future implementation

Participants stated that some plans that will be implemented in the future are including fulfilling athlete's fluid needs with isotonic water and mineral water, providing balanced food to meet the nutritional needs of athletes, using audio-visual learning methods to convey learning material, as well as psychological support from coaches and parents as

Table 3. Conclusions of Focus Group Discussion (FGD)

Themes/Categories	Conclusions of participants' arguments
Definition of sports sciences	The application of sciences covers sports medicine, sports nutrition, sport psychology, and biomechanics in coaching athletes to achieve optimal targets and performance.
Benefits of sport sciences implementation	It can serve as a reference for the development and growth of children, shaping them into quality athletes, enhancing their performance to its optimal level, minimizing the likelihood of severe injuries, and fostering the creation of healthy athletes.
Current implementation	Some football clubs (SSB) have started implementing sports sciences but have yet to implement it fully. Some SSBs have begun incorporating elements of psychology, biomechanics, nutrition, medical support, and coaching.
Plan for implementation	<ul style="list-style-type: none"> • Consuming isotonic drinks and plain water to maintain good hydration • Consuming balanced food, dairy, and supplements to meet athletes' nutritional needs. • Utilization of audio-visual learning methods for educating athletes • Provision of psychological support from coaches and parents to prepare athletes mentally
Enabling factors	The availability of licensed coaches
Inhibiting factors	<ul style="list-style-type: none"> • Inadequate human resources and funding • Unpreparedness of training and management systems, as well as parent • Gaps in knowledge and comprehension of sports sciences among involved parties
Readiness and commitment to implementation	Some coaches are enthusiastic and express their readiness and commitment to implement sports sciences. However, parents expressed the need for improved comprehension among all parties involved in implementing sports sciences within the football clubs (SSB).

mental preparation (Table 3).

"...we plan to provide psychological assistance to help accelerate the athlete's mental preparation..." (manager from group B)

"...the audio-visual learning method through video presentation delivered by the coach is very good to be applied in SSB..." (parent from group B)

"...fulfilling post-exercise fluid needs through mineral and isotonic water can be applied to maintain athlete hydration..." (coach from group A)

"...we tried to meet the nutritional needs of athletes by providing milk and fruit every week..." (parent from group A)

Possible enabling factors

Participants' opinion regarding enabling factors of sports sciences implementation in SSB is the availability of licensed coaches (Table 3).

"...we have coaches who are experienced as athletes.... we also collaborate with sports sciences majors in university..." (manager from group A)

"...some of the coaches at our place already have a little knowledge about sports sciences..." (coach from group A)

Possible inhibiting factors

Participants' opinions regarding inhibiting factors of sports sciences implementation in SSB included insufficient human resources and funds, parents' unpreparedness to implement the knowledge, and overlapping understanding of the parties involved (Table 3).

"...it is difficult to implement what types of food are allowed before, during, and after the match..." (parent from group A)

"... lack of communication between coaches, management, and parents.... there is no cooperation except during the match" (coach from group B)

Readiness and commitment

Some coaches were enthusiastic and expressed their readiness to commit to implementing this sports science. However, the parents stated that there must be a need to improve comprehension among all parties involved in implementing sports sciences (Table 3).

"...sport sciences both in terms of nutrition, psychology, and physiology has considerable influence on the performance of athletes on the field, so its application is fundamental to do..." (coach, from group A)

"...athletes tend not to trust what parents said, so cooperation from coaches, parents, and management is needed..." (parent, from group A)

DISCUSSION

Results from this study highlight the improvement in the knowledge of coaches and parents on sports sciences and their attitudes towards its implementation in their SSB. In addition to scoring higher points during the test after training, participants could present their arguments on sports sciences and ideas on how to implement sports sciences in their SSB, as shared during the FGD session. To our knowledge, this program was the first to successfully introduce the concept of sports sciences to coaches and parents and unravel the possibility of its implementation in SSB.

Sports science is a body of knowledge that applies a range of evidence-based principles and methods to improve athletic performance.⁹ The discipline includes but is not limited to physiology, sports psychology, anatomy, sports nutrition, biomechanics, biochemistry, biomechanics, and kinesiology. These statements could be identified during FGD as expressed by the participants. In the context of athlete's training, participants defined sports sciences as applying knowledge in sports medicine, nutrition, psychology, and biomechanics to achieve optimal athletic performance. The participants understandably missed out on other areas not covered in the training due to the growing body of knowledge about

sports performance.¹⁰ Furthermore, the benefits of sports sciences implementation that our participants agreed on during FGD were beyond just improving athletic performance. They also believed that it could be a reference for ensuring their young athletes' optimal health growth and development. Indeed, one of the topics covered in training was long term athlete development (LTAD). This model uses long term planning in young athletes' training regarding their developmental stages.¹¹ It was clear that our participants had established an understanding of sports sciences related to their circumstances: training young athletes.

When asked about sports sciences implementation, a few representatives from SSB reported having partially implemented sports sciences, although rather incidentally, according to emerging needs, such as encouraging adequate sleep and avoiding junk foods. However, all coaches and parents had positive attitudes toward applying sports sciences. Some practical ideas on their plans of implementation that were mentioned were mostly from the aspect of nutrition, such as maintaining good hydration using the recommended beverages and following a balanced diet with supplementation when needed to meet the dietary requirements for athlete's training and growth. The second most frequently discussed topic during the FGD was the importance of having good mental development; thus, incorporating sports psychology was deemed important. This finding aligns with previous research reporting that nutrition and mental training were coaches' primary interests due to their high importance.¹² In addition to improved athletic performance, sports nutrition was believed to support the maintenance of optimal growth and health while incorporating mental preparation into training programs plays a role in recognizing athletes' potential and long-term success in sports.^{13,14,15}

In addition to participants' willingness to apply sports sciences in their SSB, participants were able to identify their enabling factors and barriers to the implementation. Their positive attitudes towards the implementation were primarily due to the presence of some coaches with licenses. Meanwhile, as

consistently reported by previous research, funding was once again reported to be the main barrier in implementing sports sciences by our participants. Funding might be a sounder problem in SSB since it typically relies only on small monthly fees from athletes, and obtaining sponsorship was very difficult.¹⁶ Participants also admitted that to apply sports sciences successfully, they must improve their coaching and management system and achieve a shared understanding of this topic among all stakeholders. This highlights the importance of knowledge transfer of sports sciences at the grassroots level, including translating sports sciences into practices to improve coaching and management systems. Indeed, it has been frequently reported that research in sports sciences keeps growing while translating it into day-to-day practice during athlete training, which has always been challenging.¹⁷

Education that enhances interactions between coaches, management, and researchers is among the strategies to fill the gap in translating research into practice.¹⁷ Carrying the same mission, this program aimed to provide theoretical and practical knowledge on sports sciences that might be applied in SSB. Compared to training centers, SSB provides less intensive training for young athletes; for instance, athletes only come to the training ground twice a week instead of twice a day. Therefore, implementing sports sciences in SSB should be modified to match the available resources.

The present study is, however, entitled to some strengths and limitations. As the first to conduct a community program to improve coaches' and parents' knowledge of sports sciences, this study measured the quantitative and qualitative outcomes. From the FGD, the study assessed participants' knowledge and attitudes toward implementing sports sciences in their SSB. Unfortunately, this study did not collect data on participants' sociodemographic characteristics as some variables might affect their arguments, such as age and level of education. Despite the minor limitations, this study has successfully shed some light on the possibility of implementing sports sciences in SSB.

CONCLUSION

The study successfully improved coaches' and parents' knowledge and attitude towards sports sciences implementation in SSB, as shown by the increased points scored and passing percentage during the post-test and reasonable conclusions from FGD. Participants understood the definition and benefits of sports sciences implementation well. Sport sciences might be applied in SSB with improved coaching and management systems and stakeholders' mutual understanding of sports sciences. It must also match the available resources, such as funding. The future program should assist all stakeholders in optimizing their resources to develop a training program that applies sports sciences in their SSB.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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AUTHOR CONTRIBUTION

RM, AE, MP, IN, and VR conceptualized the grand design of the whole program. RM, AE, MP, YP, RS, RW, IN, VR, DU, and LF designed and conducted the program. RM, AE, IN, VR, DU, LF, and RK analyzed and wrote the manuscript. All authors reviewed the final manuscript.

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