



The Effectiveness Of Small-Side Games Training On Increasing Team-Work Of Prospective Polewali Mandar Football Athletes

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ABSTRACT

Teamwork is an important aspect of football that requires coordination, communication, and collective decision-making. Small-sided games (SSG) training has the potential to develop these abilities through modified game situations. This study aims to analyze the increase in teamwork of prospective football athletes after participating in the SSG training program at Polewali Mandar. The study uses a quantitative approach with a pre-experimental design of the one-group pretest-posttest type. A total of 30 prospective male football athletes aged 15–18 years from PS Sandeq Polewali Mandar were selected using the purposive sampling technique. The SSG training program was carried out for eight weeks, with teamwork measurements before and after the intervention. Data were analyzed using descriptive statistics and paired-samples t-test at a significance level of 0.05. The results showed an increase in the average teamwork score from 45.10 in the pretest to 52.83 in the posttest, with a difference of 7.73 points or 17.15%. All participants (100%) experienced an increase in teamwork scores. The results of the statistical test showed a significant difference, $t(29) = 16.054$; $p < 0.001$, with a measure of Cohen's effect DZ of 2.93. These findings suggest that SSG's training program was followed by a significant increase in teamwork in prospective soccer athletes. Thus, SSG has the potential to be a training approach to support the development of teamwork, although research with control groups is needed to ensure its causal effectiveness.

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1. INTRODUCTION

Soccer is a team game that requires players to integrate technical skills, tactics, physical conditions, and the ability to work together in achieving game goals. The success of a team is not only determined by the individual's ability to control the ball, make passes, or score goals, but also by the ability of the players to build effective working relationships during the match. Players need to understand each other's roles, provide support to teammates, communicate effectively, and make decisions that are in accordance with the game situation. Thus, *teamwork* is one of the important aspects in coaching prospective soccer athletes, especially in the adolescent age group who are still in the stage of developing skills and understanding the game.

In the game of soccer, teamwork can be understood as the ability of players to coordinate actions and integrate individual contributions to achieve a common goal. This cooperation is reflected in communication between players, coordination of movements, support for players who control the ball, the ability to read game situations, and the willingness to perform roles for the benefit of the team. Cooperation is not only formed through understanding the coach's instructions, but also requires repeated experience in dealing with game situations that require players to interact, adjust decisions, and respond to the actions of teammates and opponents. Therefore, the training process of prospective athletes needs to be designed not only to improve individual skills, but also to provide opportunities for players to develop cooperative behaviors in the context of real games.



One relevant training approach for this purpose is *small-sided games* (SSG), which is a form of soccer game with the number of players, field size, duration, or rules modified according to the training objectives. This approach retains the main characteristics of the game of soccer, but allows the coach to direct the player's attention to a specific aspect through the regulation of the game conditions. Clemente et al. (2021) explain that SSG is widely used in team sports training because modification of game conditions can affect the technical response, tactical behavior, and physical demands of the player. In a group of young age players, the results of their systematic review and meta-analysis showed that the SSG program had a positive influence on the implementation of technical skills over control conditions. However, the studies included in the review have not provided sufficient results to conclude the influence of the SSG program on tactical behavior comprehensively. These findings demonstrate the importance of advanced research that specifically measures aspects of player behavior and interaction, not just technical skills.

The advantage of SSGs in the context of developing teamwork lies in their characteristics that place players in situations of repetitive interaction. When the number of players and playing space are limited, players need to determine when to pass the ball, move in search of space, provide support to the ball carrier, close the opponent's space, and adjust the position to the movement of teammates. These situations have the potential to encourage collective communication, coordination, and decision-making. Clemente et al. (2020), through a systematic review of the influence of SSG on the tactical behavior and collective dynamics of soccer, showed that changes in the number of players, field size, game configuration, as well as training rules are related to changes in tactical behavior and patterns of collective interaction. Machado et al. (2020) also showed that modification of game conditions is related to differences in the tactical behavior of young players. Nonetheless, changes in tactical behavior or collective dynamics cannot necessarily be equated with increased *teamwork* as a broader construct. Therefore, improvements in teamwork need to be measured specifically through operationally defined indicators.

In the development of aspiring youth soccer athletes, the use of SSGs has the potential to be an appropriate approach because players not only practice performing skills separately, but also apply them when interacting with other players. Exercises can be designed with a game format that encourages players to provide each other with information, maintain support between players, coordinate movements, and achieve game goals together. However, the effectiveness of such exercises should not be assumed solely based on the popularity of their use. Its effect on teamwork needs to be proven through measurements before and after the training program, using instruments that have a clear conceptual basis and assessment procedures.

Based on this description, there is a need to specifically examine the effectiveness of *small-sided games* training on increasing *the teamwork* of prospective football athletes at Polewali Mandar. Research on SSG has discussed many technical, physical, and tactical aspects, while the measurement of teamwork as the main outcome of the study requires special attention. In this context, the study is planned to use a single-group design with pre- and post-intervention measurements. The training program will be carried out for eight weeks in prospective youth football athletes. A comparison of *teamwork* scores before and after the program is expected to provide an empirical picture of changes in teamwork after participating in SSG training.

Thus, this study aims to analyze the effectiveness of *small-sided games* training on increasing *the teamwork* of prospective football athletes in Polewali Mandar. The results of the study are expected to contribute to the development of youth soccer training methods, especially in designing exercises that are not only oriented to individual skills, but also to the ability of players to work together in achieving game goals. Practically, the findings of the study can be considered for coaches in evaluating the use of SSG as part of the coaching program for prospective football athletes.

2. IMPLEMENTATION METHOD

Design, participants, and research venues

This study used a quantitative approach with a pre-experimental design of the one-group pretest–posttest type. This design was used to determine the changes in the teamwork of prospective football athletes before



and after participating in the small-sided games (SSG) training program for eight weeks. Measurements were taken before the training program (pretest) and after the training program was completed (posttest), then the results of the two measurements were compared to identify changes in teamwork scores. Because this study did not use a control group, the changes found could not be fully attributed only to the SSG intervention.

The research participants amounted to 30 prospective male football athletes aged 15–18 years who actively participated in training at PS Sandeq, Polewali Mandar, West Sulawesi. The selection of participants was carried out using purposive sampling techniques, with the criteria that participants were active in practicing football and willing to participate in the entire series of research programs. The research was carried out in 2023 at PS Sandeq. The research data was obtained through teamwork measurements before and after the training program. The details of the scoring instruments and procedures need to be adjusted to the available research documentation, because the original instruments used at the time of data collection have not been identified with certainty.

Training program

The small-sided games (SSG) training program is designed to support the development of teamwork of prospective soccer athletes through game activities that emphasize communication, movement coordination, support between players, joint decision-making, and achievement of team goals. The program is planned to last for eight weeks and involves 30 prospective PS Sandeq soccer athletes aged 15–18 years. In its implementation, the game uses a modified number of players and playing spaces according to the needs of the practice, so that each player has the opportunity to interact, communicate, provide support to teammates, and adapt actions to the game situation. The rules of the game can also be directed to encourage the involvement of all players and strengthen orientation towards a common goal.

The implementation of training is arranged in stages, starting from the habit of simple communication and coordination, the development of support and movement without the ball, to the application of collective decision-making in more complex game situations. Each session is designed to include warm-ups, implementation of SSG according to training objectives, and cool-down. The development of training is directed from relatively simple game situations to situations that demand higher coordination and cooperation. Evaluation of teamwork changes is carried out through a comparison of measurement results before and after the training program. The frequency of training per week, the duration of each session, the format of the number of players, the size of the field, and the rules of the game need to be adjusted to the records of the training program that were actually used in the 2023 research so that the description of the final method remains accurate and accountable.

Data processing and analysis

The research data was processed through the stages of checking the completeness of the data, grouping of pretest and posttest scores, and tabulation of each participant's score. Descriptive analysis was planned to describe the average score and standard score deviation before and after the small-sided games (SSG) training program. Furthermore, the change in score was calculated by comparing the results of the final measurement with the results of the initial measurement in the same participant. Data processing was carried out by paying attention to the consistency of recording and completeness of each participant's data.

Inferential analysis is planned using the paired-samples t-test to test the difference in teamwork scores before and after the training program if the analysis assumptions, especially the distribution of the difference score, are met. If these assumptions are not met, the Wilcoxon signed-rank test can be used as a nonparametric alternative. The significance level is set at 0.05. The interpretation of the analysis results is carried out based on the difference in scores, significance values, and effect sizes if they can be calculated. However, because the original scoring instruments and systems of the 2023 research have not been definitively identified, this analysis needs to be adjusted to the data structure that is actually available. Statistical values and test results are not included before the original research data is analyzed.



3. RESEARCH RESULTS

Participant Characteristics and Descriptive Statistics

The analysis involved 30 prospective male football athletes. Teamwork scores were analyzed at two measurement times, namely before (pretest) and after (posttest) of the small-sided games (SSG) training program. The descriptive statistics presented included average, standard deviation, median, and minimum and maximum scores.

Table 1. Descriptive statistics of teamwork scores before and after SSG training

Statistics	Pretest	Posttest
Number of participants	30	30
Average	45,10	52,83
Standard deviation	5,84	5,90
Median	45	54
Score minimum	31	39
Score maximum	56	63

Table 1 shows that the average teamwork score increased from 45.10 (SD = 5.84) on the pretest to 52.83 (SD = 5.90) on the posttest. The average score difference was 7.73 points. The median score also changed from 45 on the pretest to 54 on the posttest. The pretest score ranged from 31–56, while the posttest score ranged from 39–63.

Changes in Scores for Each Participant

Changes in individual scores are calculated by subtracting the pretest score from the posttest score. A positive difference value indicates an increase in the score, a zero value indicates a fixed score, and a negative value indicates a decrease in the score.

Table 2. Distribution of changes in participants' teamwork scores

Categories of changes	Number of participants	Percentage
Increased score	30	100,0%
Fixed score	0	0,0%
Decreased score	0	0,0%
Total	30	100,0%

The results of the calculation showed that 30 participants (100.0%) experienced an increase in scores, 0 participants did not change, and 0 participants experienced a decrease. The average score increase was 7.73 points (SD = 2.64), with a minimum difference of 2 points and a maximum of 14 points. The average percentage change to the average pretest score was around 17.15%.

Normality Test of Difference Score

Before the paired difference test is performed, the normality of the difference score (posttest minus the pretest) is checked using the Shapiro–Wilk test.

Table 3. Results of the normality test of difference scores

Parameter	Value
Statistics Shapiro–Wilk (W)	0,958
Value p	0,268
Side Significantly	0,05

The Shapiro–Wilk test yielded $W = 0.958$ with $p = 0.268$. Because the p-value is greater than 0.05, there is not enough evidence to refute the assumption of the normality of the difference score. Thus, the paired-samples t-test is used to test the difference in the average of pretest and posttest scores.



Test Results of Pretest and Posttest Scores

Differences in teamwork scores before and after the training program were analyzed using a paired-sample t-test. The analysis reported mean differences, 95% confidence intervals, t-statistical values, p-values, and effect measures.

Table 4. Results of the paired-samples t-test teamwork score

Parameter	Results
Rata-rata pretest	45,10
Rata Rata Pole Test	52,83
Average difference (posttest – pretest)	7,73
Standard deviation of difference	2,64
95% difference confidence interval	6.75 to 8.72
Statistics t	16,054
Degree of freedom (df)	29
Value p (bidirectional)	< 0.001
Cohen's dz	2,93

The paired-samples t-test showed a difference in teamwork scores between pretest and posttest, $t(29) = 16.054$, $p < 0.001$. The average score difference was 7.73 points, with a 95% confidence interval from 6.75 to 8.72. Because the confidence interval did not include zero and the p-value was smaller than 0.05, the difference in the mean score was statistically significant. The Cohen's dz effect size of 2.93 illustrates the magnitude of the standardized difference between the two paired measurements.

Descriptively, the average teamwork score increased by 7.73 points, from 45.10 in the pretest to 52.83 in the posttest. As many as 30 out of 30 participants showed an increase in scores. The results of the paired-samples t-test showed a statistically significant difference, $t(29) = 16.054$, $p < 0.001$, with a 95% confidence interval for the mean difference of 6.75–8.72 and the measure of Cohen's dz effect = 2.93.

4. RESEARCH DISCUSSION

The results of the study showed an increase in the teamwork of prospective PS Sandeq Polewali Mandar football athletes after participating in *the small-sided games* (SSG) training program for eight weeks. This was shown by an increase in the average teamwork score from 45.10 in the pretest to 52.83 in the posttest, with an average difference of 7.73 points or an increase of about 17.15% from the initial condition. The results of the paired-samples t-test showed a statistically significant difference, $t(29) = 16.054$; $p < 0.001$. In addition, all 30 study participants experienced an increase in scores after participating in the training program. These findings indicate that the implementation of SSG is related to positive changes in teamwork skills in prospective youth football athletes.

The increase in teamwork can be understood through the characteristics of SSG which provide opportunities for players to actively engage in game interactions. In game situations with fewer players, each individual faces demands to adjust movements, make decisions, and respond to the actions of teammates and opponents. Gonçalves et al. (2016) show that the regulation of cooperation and competition conditions in SSG can affect the collective movement behavior of soccer players. The study shows that collective behavior in games is not fixed, but can change according to the characteristics of the tasks faced by the players. In the context of this study, repeated experiences facing game situations that require coordination can be one of the theoretical explanations for the increase in teamwork scores after the implementation of the training program.

The findings of this study can also be explained through the perspective of teams as complex adaptive systems. Silva et al. (2016) explain that changes in the number of players in SSG can affect patterns of collective behavior and interpersonal coordination. In the study, changes in the number of players resulted in variations in the spread of player positions, while some spatial and temporal relationships between players could still be maintained. This suggests that players are able to adapt the organization of their movements to changing game demands. Based on this perspective, the increase in teamwork in this study can be



interpreted as a change that may be related to the development of players' ability to adjust individual contributions to collective needs. However, since this study did not directly measure spatial and temporal coordination, the relationship is still a conceptual explanation that needs to be further tested.

Another relevant aspect in understanding improved teamwork is the linkage between individual decision-making and team needs. Correia et al. (2012) show that changes in the boundaries of training tasks can shape player decision-making behavior in team sports. In a soccer game, individual decisions do not take place in isolation, but are influenced by the presence of teammates, opponents' positions, available space, and game goals. Therefore, SSG training can provide situations where players learn to adapt decisions to changing game conditions. Such experiences have the potential to support the development of cooperation because players need to consider the actions of other team members before determining game responses.

The results of this study are also related to the research of Silva et al. (2014) which compared the tactical behavior of soccer players in the 3-on-3 and 6-on-6 SSG formats. The study shows that differences in game formats are related to variations in the tactical behavior of young players. These findings provide an understanding that the regulation of the number of players can change the demands of individual interaction and involvement during the game. In the context of coaching prospective soccer athletes, changes in game formats can be leveraged to present situations that encourage players to be more active in providing support, adjusting positions, and participating in game organization. However, an increase in tactical behavior cannot be directly equated with an increase in teamwork because the two constructs have different measurement indicators.

The increase in teamwork scores in all study participants also showed consistency in the direction of change after the implementation of the SSG exercise. A total of 30 participants experienced an increase in scores with an individual change range of between 2 and 14 points. These findings show that the increase did not only occur in the average group, but was also reflected in each participant. However, the variation in the magnitude of the increase indicates a difference in individual responses to the training program. Silva et al. (2014) explained that the dimensions of the field and the skill level of players can affect collective tactical behavior in modified games. Based on these findings, differences in initial abilities and individual characteristics are factors worth considering when explaining variations in teamwork development. However, this study has not specifically analyzed the factors that cause the difference in the magnitude of the increase between participants.

Furthermore, Vilar et al. (2014) show that changes in the dimensions of the field in SSG can affect players' chances of maintaining possession, passing to teammates, and shooting at goal. These findings show that the game environment provides different action opportunities according to the designed conditions. In relation to teamwork, the opportunity to pass, provide support, and adjust movements is part of the situation that allows players to build game coordination. Thus, the use of SSG has the potential to support cooperative learning through hands-on experience in dealing with various demands of the game. However, these benefits cannot be separated from the coach's accuracy in determining the size of the field, the number of players, and the rules of the game according to the purpose of the training.

The magnitude of the increase in teamwork in this study was reinforced by Cohen's d_z value of 2.93 which indicates a very large standardized measure of change in the study group. The 95% confidence interval for the mean score difference was in the range of 6.75 to 8.72, suggesting that the estimated mean change led to an improvement. Nonetheless, the large effect size needs to be interpreted considering the study design. The use of a single group without a comparison has not allowed the researchers to confirm that all changes were caused by SSG training. Other factors, such as regular training experience, increased familiarity between players, and skill development during the study period, also have the potential to contribute to changes in teamwork scores.

Practically, the results of this study imply that SSG can be considered as one of the training approaches in coaching prospective youth soccer athletes, especially to support the development of teamwork skills. Coaches can design game activities that provide opportunities for players to communicate, provide support, adjust positions, and make decisions based on collective needs. However, the implementation of SSG should not only be based on reducing the number of players or the size of the field. The design of training needs to



consider the suitability between the goals of coaching and the demands of the game given to the participants. Thus, the development of teamwork through SSG requires systematic training arrangements and evaluation of player development.

Overall, this study shows that an eight-week *small-sided games* training program was followed by a significant increase in teamwork scores in prospective PS Sandeq Polewali Mandar football athletes. These findings gain conceptual support from previous research on interpersonal coordination, collective behavior, decision-making, and player adaptation to modification of game conditions. The contribution of this study lies in the provision of preliminary empirical evidence regarding changes in teamwork after the implementation of SSG in the context of adolescent football coaching. Further research with control groups, validated teamwork instruments, and more specific measures of cooperative behavior are needed to strengthen the conclusions regarding the effectiveness of SSG training.

Limitations of the study

This study has several limitations that need to be considered in interpreting the research results. First, the use of a *pre-experimental* design with a *one-group pretest-posttest* approach without a control group limits the study's ability to ensure a cause-and-effect relationship between *small-sided games* (SSG) training and improved teamwork. Score changes found after the intervention cannot be fully attributed to the SSG training program because there is a possibility of other factors, such as regular training experience, individual skill development, and increased familiarity between players during the study period. In addition, the study only involved 30 prospective male football athletes aged 15–18 years old from one club, namely PS Sandeq Polewali Mandar, who were selected using *the purposive sampling* technique. This condition limits the generalization of the results of the study to the population of football athletes who have different characteristics of age, gender, skill level, and coaching environment.

Other limitations are related to teamwork measurement and the implementation of training programs. Documentation regarding measurement instruments, scoring procedures, and evidence of the validity and reliability of instruments has not been fully identified, so the accuracy of teamwork construct measurements cannot be evaluated comprehensively. In addition, details of training implementation, such as session frequency, duration, number of players, field size, and game rule modifications, have not been adequately documented in the manuscript. This study also only compares teamwork scores before and after interventions without follow-up measurements to determine the sustainability of the improvements obtained. Therefore, the results of the study need to be interpreted carefully, especially in explaining the mechanism of teamwork change and the sustainability of the benefits of SSG training.

CONCLUSION

The results showed that there was a significant increase in teamwork in prospective PS Sandeq Polewali Mandar football athletes after participating in the *small-sided games* (SSG) training program for eight weeks. The increase was shown by the change in the average teamwork score from 45.10 in the pretest to 52.83 in the posttest, with a difference of 7.73 points or around 17.15%. The results of the *paired-samples t-test* showed a statistically significant difference, $t(29) = 16.054$; $p < 0.001$, with a measure of Cohen's d_z effect of 2.93. All study participants also showed an increase in teamwork scores after participating in the training program. These findings indicate that SSG has the potential to be a training approach that supports the development of teamwork in the development of prospective adolescent soccer athletes, although the causal effect cannot be ascertained as the study did not involve a control group. Based on these findings, it is recommended that adolescent soccer coaches consider the implementation of SSG in a structured manner as part of teamwork development programs, as well as that further research use control groups, validated measurement instruments, and long-term evaluations to obtain stronger evidence on the effectiveness of SSG training.



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