PJSS

ISSN: 1309-0356

Pamukkale Journal of Sport Sciences
2014, Vol.5, No.1, Pg:113-127

Received : 08.05.2013
Accepted : 20.11.2013

Hosam Hussein Abdel-Hakim[1]

[1]**Faculty of Physical Education, Mansoura University, Mansoura, Egypt**

hosam.hussein@yahoo.com

ORIGINAL ARTICLE

QUANTITATIVE ANALYSIS OF PERFORMANCE INDICATORS OF GOALS SCORED IN THE FUTSAL WORLD CUP THAILAND 2012

Abstract

The main objective of this study was to analyze the performance indicators and characterize of goals scored in the Futsal World Cup Thailand 2012, to describe the most relevant parameters that can improve the efficacy of the teams. The analysis was based on 349 goals were scored in 52 matches played during this tournament. The data were obtained from the FIFA Website. Spreadsheets were used as a data collection instrument, and the applied method was descriptive observational analysis. The results showed that The scoring rate of the Futsal World Cup Thailand 2012 was 6.71 goals per match, the highest scoring goals at the fourth period (31:40 min) 32.95% from all goals were scored, most goals were scored landing in the lower part of the goal 76.2 % of shots 98.7% from total goals scored inside the penalty area, specifically the area between the line of goal and 10 meters from the penalty spot at the right 39.9%, most goals were scored 60.4% by open playing from the area between 10 meters from the penalty spot with line of goal and displays of the court 20 meters 73.1% of the total goals scored , and the rest 39.6% was scored by individual playing. By using T-Test winning teams had significantly higher values than the losing team for the following game statistics: goals scored, total shots, shots on goal and effectiveness ($p<0.05$). However there is no significant difference in ball possession and corners between winning teams and losing teams ($p>0.05$). The results of the present study should not only give coaches a fresh insight into how to create more effective tactical plans, but it also provides useful information on the characteristics of how goals scored in Futsal matches, gives general values that help to understand and analyze Futsal and help to design training sessions.

Keywords: Quantitative analyses, evaluation, goals, futsal world cup

INTRODUCTION

Although soccer is one of the most popular sports today, interest in Futsal slowly starts to grow Roxburgh, (2008). Futsal (the official name for five-a-side indoor soccer) is an invasion game, to score a goal it is fundamental to advance along the court and it is a very challenging and demanding sport. A lack of space and time in which to play obliges the players to move and think quickly in order to anticipate events on the court, create free space and playing opportunities. Therefore, players should organize their positions collectively to increase shots to goal opportunities when attacking and to increase tackles chances when defending Frencken and Lemmink, (2008). In international tournaments, teams are judged on their ability to win matches. Behind the wins, the teams must have effective ways to win the ball, create successful attacks first to hit the attacking third of the area, create effective scoring chances and to discharge them by scoring goals with a high efficiency Luhtanen et al., (2001). Among the many technical and tactical aspects of players' behavior, the goals are the most studied. It is true that the goal is the key of success for the teams and therefore its analyses in all matches in a big tournament allows for multiple assessments Michaildis et al., (2013). Matches are characterized by a low frequency of goal scoring Abt et al., (2002), making the ability to score goals perhaps the most important requirement for success (Jinshan, et al., (1993), Leite, (2012) and suggesting that investigations into the characteristics of goal score are of importance Yiannakos and Armatas, (2006).

Match analyses are an important investigation for determining the quality of the game of Futsal team and other's actions during the match Reilly, (2001). It is the objective recording and examination of behavioral issues that occur during competition Carling's t al., (2005), and it is important to coach understand better or worse performance of Futsal team. The usage of the scout for match analyses is recommended because it is an instrument sample and with international reference Suzuki and Nishijima, (2004). Especially coaches are prone to making subjective judgments and may be unable to recall events reliably; they are increasingly turning to match analyses as a means of optimizing the training process of their players and teams Hughes and Franks, (2004).

Researchers have evaluated players' physical efforts during soccer and Futsal matches, such as distance covered and high intensity running A´lvarez et al., (2009); Barros et al., (2007); Castagna et al., (2009); Duarte et al., (2009). Others have measured performance indicators that discriminate the offensive and defensive actions , goals scored, during soccer

and Futsal matches Armatas, et al., (2009); Clemente, (2012); Hughes and Franks, (2005); Hughes et al., (2012) ; Lago, et al., (2010) ; Leite, (2012); Luhtanen , et al., (2001) Marques, (2009) Njororai , (2013); Peñas, et al., (2010).

Quantitative analyses are increasingly being used in team sports to better understand performance, can provide feedback to players and coaches, allowing them to enhance their performance and interpretation of the activity beyond what can be achieved by personal observation Vilar et al.,(2010). A performance indicator is a selection, or combination, of action variables that aim to define some aspects of a performance in a given sport and these performance indicators, should relate to successful performance or outcome Hughes and Bartlett, (2002), provide opportunities to analyze the intrinsic characteristics of the teams in order to improve the quality of the training and the quality of the opponent observation Clemente, (2012). Therefore, effective evaluation of these components requires knowledge of the contextual factors that can potentially affect performance Taylor et al., (2008).

Especially in team games, it is difficult, if not impossible, for coaches to observe and remember all the key events taking place within a training session or match, equipped exclusively with their knowledge of the sport in question and their innate powers of observation. Previous literature Hughes and Franks, (2004); Hughes et al., (2012) have proposed that notational analyses serve five purposes: Analyses of movement, Educational use for both coaches and players, Tactical evaluation, Development of a database/modelling, Technical evaluation.

Therefore, due to a small number of studies related to tactical demonstration of Futsal teams, so this study is the first to have applied a multivariate analyses to performance indicators of Futsal World Cup matches. The aim of this study was to identify specific performance indicators that might be used to either (I) evaluate offensive actions, which resulted in finalizations in the opposing goals scored in the Futsal World Cup Thailand 2012 Specifically, it was examined the timing of achieving the goal, the parts of the goal the ball landed, the area from which the goal was scored and Parts of the area from where the assists came outcome (II) better understand the factors associated with a team's success in Futsal matches, to create modern parameters that can be used for the betterment of the Futsal training process.

METHODS

Participants

The tournament was hosted by Thailand between 1st and 18th November 2012. The analyses was based on 52 matches played. An overall of 349 goals was scored. More specifically the final sample, therefore, comprised 333 goals from 349 of the Championship (equivalent to 95.42% of all goals scored). The data were obtained from the FIFA Website:

(http://ar.fifa.com/futsalworldcup/matches/groupstage.html). Castellano et al. (2012) established the reliability of the FIFA match statistics by randomly coding five matches and compared with the FIFA website data. The resulting values using Cohen's Kappa (K) were between 0.93 and 0.97. This establishes a high reliability index for the FIFA website data.

Procedures

Data collection method

The data were collected through structured spreadsheet analyses method assisted in observing: The studied variables were divided into four groups (Table 1). The following game-related statistics were gathered: scoring frequency per 10 minutes (a. 1-10, b. 11-20, c. 21-30, d. 31-40, plus extra time), total goals scored, total shots, shots on goal, effectiveness (shots on goal x 100/total shots), ball possession, corners, determine in which part of the goal the ball landed using a diagram of the goal's area, determine in which part of The court the goal scored using a diagram of the court area, determine how the goals were made using the components of the body, determine from where the assists came from two scored goals.

Table 1: Variables studied in the Futsal World Cup Thailand 2012.

Group of variables	Variables or game statistics or Performance indicators
Variables related to goals scored	Total goals scored; average goals per match; scoring frequency per each period (10 minutes) (a. 1-10, b. 11-20, c. 21-30, d. 31-40, plus extra time); parts of the goals the ball landed; the areas of the court where goals were scored ; parts of the body which used to score goals; parts of the court to determine from where the assists came.
Variables related to goals scored between winning, and losing teams	Total goals scored; total shots; shots on goal; Effectiveness[1] ; ball possession; corners

Effectiveness[1]=Shots on goal×100/Total shots

Applied method

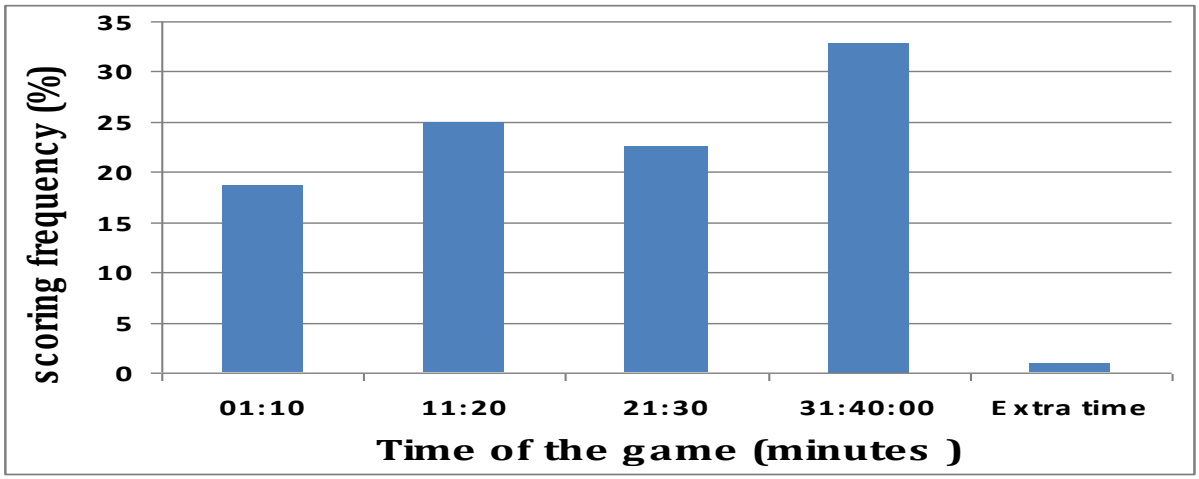
The methodology used for this study was the observational descriptive. To examine the importance of specific tactics and technical parameters to a supportive modality, coach's recourse to the observation area or game analyses. All the 333 goals scored were analyzed. The images were analyzed, at first, with normal transmission speed. After that, each move was seen again at a slower speed (1/2, 1/4 or 1/8 normal speed) for a better accuracy of the action type, tactical players' movement, ball trajectory and conclusion of moves. These procedures are agreed with Leite, (2012).

Statistical Analyses

All analyses were executed in SPSS for Windows version 16.0 . T-Test was used to determine the statistically significant differences, and the level of significance was set at $p<0.05$.

RESULTS

349 goals were scored in 52 games were played, in average 6.71 goals per match. 18.62% (65 goals) of the goals were scored in 1-10 min; 24.93% (87 goals) were scored in 11:20 min; 22.64% (79 goals) were scored in 21:30 min; 32.95% (115 goals) were scored in 31:40 min; 0.86% (3 goals) were scored at the extra time (graph 1).



Graph 1. The frequency of goals scored in each period of play during matches in the futsal World Cup Thailand 2012

By analyzing the parts of the goal the ball landed, it can be seen that most goals were scored landing in the lower part of the goal, 26.4% (88 goals) were scored in the lower left of the goalkeeper; 24.3% (81 goals) were scored in the lower center of the goal; 25.5% (84 goals) of the goals were scored at the lower right of the goalkeeper, Thus, the total numbers of goals were scored at the lower represents 76.2 % (53 goals) compared to goals were scored at the upper portion of the goal, which represents 23.8% (80 goals) of the total goals scored in the tournament (Figure.1).

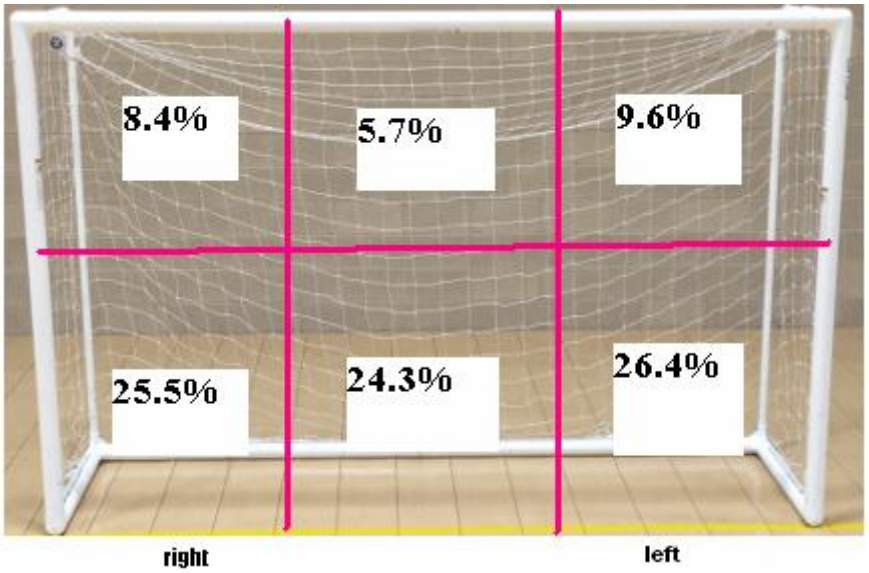


Figure 1. The areas in which the ball reached the goal in the 333 goals observed

By analyzing the components of the body which used to score goals. It can be seen that most goals were scored by shots 98.7% from total goals scored, 60% by right-footed, 38.7% of left -footed, and the rest 1.3% was scored by the head and chest.

By analyzing the areas where goals were scored, At the futsal World Cup Thailand 2012 the majority of the goals (39.9%) were scored from inside penalty area, specifically the area between a line of goal and 10 meters from the penalty spot at the right of the goalkeeper, The second areas where scored more goals (32.4%) is between a line of goal and 10 meters. From the penalty spot on the left of the goalkeeper, In the third place the area was scored more goals (11.4%) is between 10 and 10 meters from the center of the demarcation of the goal at the right, decreasing considerably with the increasing distance to the goal (Figure.2).

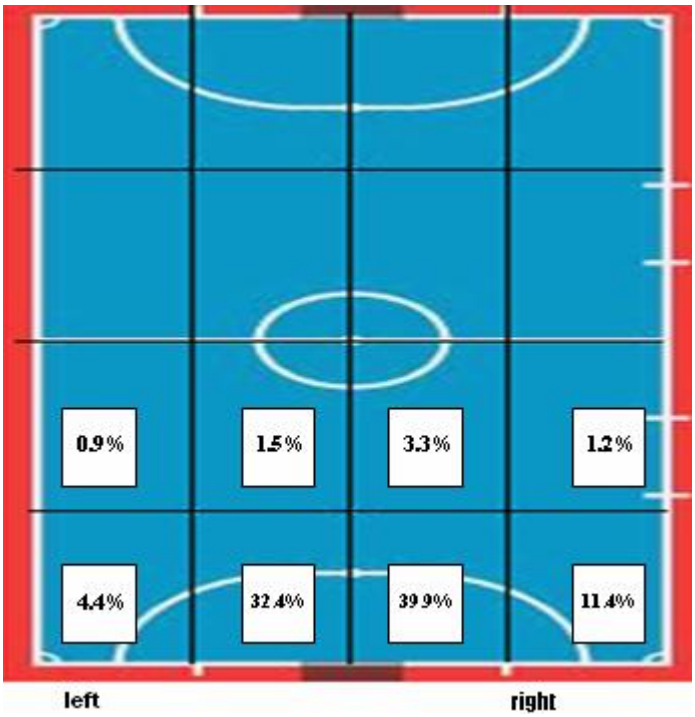


Figure 2. The parts of the court from where the goals were scored

By analyzing the area's parts of the court to determine from where the assists came to score goals, (An assist is awarded for a pass leading directly to a goal) . It can be seen that most goals were scored 60.4% from open play, and the rest 39.6% was scored by individual playing. The majority of the goals by set playing (assist) scored between 10 meters from the penalty spot in the line of goal and displays of the court 20 meters 73.1% of the total goals scored (Figure.3).

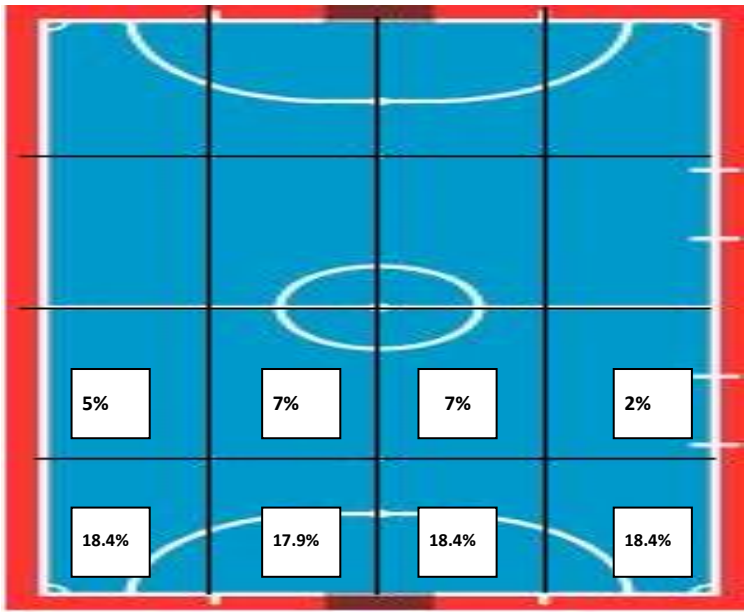


Figure 3. Parts of the court from where the assists came

In the Futsal World Cup Thailand 2012 52 matches were played, including 4 games ended in a draw. Descriptive results (Variables related to goals scored) of the game-related statistics for winning, and losing teams are presented in (Table 2) variables (Goals scored) winning teams had significantly higher values than the losing team for the following game statistics: goals scored,($t(94) = 7.61$, $p = 0.000$), total shots($t(94) = 3.61$, $p = 0.000$), shots on goal and ($t(94) = 5.76$, $p = 0.000$), effectiveness($t(94) = 4.82$, $p = 0.000$), ($p<0.05$). However there is no significant difference in ball possession($t(94) = 1.67$, $p = 0.097$), and corners($t(94) = 1.64$, $p = 0.104$), ($p>0.05$) between winning teams and losing teams.

Table 2: Descriptive results and univariate differences between winning and losing teams according to match statistics during the Futsal World Cup Thailand 2012

Variables	Winning (N = 48)		Losing (N = 48)		F	DF	T	P
	Mean	Std. D	Mean	Std. D				
Goals scored	5.27	±3.28	1.50	±0.98	20.94	94	7.61	*0.00
Total shots	39.12	±12.69	30.41	±10.87	0.21	94	3.61	*0.00
Shots on goal	17.00	±6.28	10.39	±4.85	2.05	94	5.76	*0.00
Effectiveness	43.63	±9.83	34.10	±9.96	0.30	94	4.82	*0.00
Ball possession	51.43	±8.40	48.56	±8.40	0.00	94	1.67	0.097
Corners	8.83	±4.08	7.47	±4.03	0.04	94	1.64	0.104

*Significantly different from losers ($p<0.05$).

DISCUSSION

The scoring rate compares favorably with the 2008 tournament in Brazil. The scoring rate in the Futsal World Cup Thailand 2012 averaged 6.71 goals per match in 52 games played 349 goals were scored, which compares favorably with the 6.91 per match in 56 games played 387 goals were scored the 2008 world cup tournament in Brazil (Fédération Internationale de Football Association [FIFA], (2013). This recent downward trend in scoring could be attributed to the number of matches was lower from the previous tournament.

Concerning the time of the game when goals were scored, It can be seen that the highest scoring goals at the forth 31:40 period minute (32.95%) from all goals were scored (Graph 1). The results could be attributed to physiological and tactical factors of the game, the fatigue that affect athletes conditioning and concentration is one reason that can explain the

increased numbers of goals in the second half compared to first half Bangsbo, (1994). According to Reilly, (1996) defensive players are showing stronger signs of fatigue which favors the efficacy of offensive players.

Abt et al., (2002) concluded that the frequency of goals scored during soccer matches is time dependent. According to Reilly, (1997) it is also possible that the losing team pushes players forward in order to create scoring opportunities, thereby either scoring themselves or conceding further goals. It is apparent that coaches have to use substitutions carefully to cope with physical deterioration of the starting players. Using substitutes, who bring fresh legs into the game, could also be a contributory factor to be increased scoring towards the end of matches Njororai, (2007). Previous research in soccer has reported a relationship between time and goal scoring frequency, whereby more goals are scored in the second half of matches than the first and the final 15 minutes of play (76-90+) sees the greatest goals scoring frequency Abt et al., (2002); Acar et al., (2009); Armatas and Yiannakos, (2010); Armatas et al., (2009). The outcomes could be attributed of many reasons including that in Futsal games in maximum goalkeeper can be used as a fifth player in the last minutes of the match if his team was getting behind and needed to improve its attacking chances. Thus, Coaches should therefore be aware of the higher rate of scored and conceded goals in the second half of matches and particularly the last 10 minutes. The latter period is critical in a match that is relatively balanced. A coach should therefore prepare a team's all around capacity in terms of physical condition, technique, tactical sophistication and mental concentration so that one can withstand the varied situations in a match in terms of leading or trailing in scoring goals.

To emerge winners, a team has to consistently score goals. The world cup Futsal tournament is the ultimate reflection of the development and level of modern Futsal, there is interested in how techniques and tactics are performed so that lessons are derived to be applied to the lower echelons of the game. Thus by studying the parts of the goal the ball landed, It can be seen that most goals were scored landing in the lower part of the goal, especially the lower left of the goal, and the lower right of the goal respectively (Figure 1). Most of these goals were scored by shots with a right-footed from inside the penalty area, specifically the area between the line of the goal and 10 meters from the penalty spot at the right (39.9%), The second areas where scored more goals (32.4%) is between the line of coal and 10 meters. from the penalty spot on the left (Figure 2). The results could be attributed to the goalkeeper has very little time between short, and he has to be concentrated all the time.

For attackers due to the near distance shooting first, the chances of missing the goal altogether are smaller, and second, the fortunes of the goalkeeper stopping the kick are the smallest. This seems surprising at first; it really looks more logical that it would be easier for the goalie to stop kicking that reach, the goal's center and the lower part of the goal.

The reason that, despite this fact, goalkeepers are less likely to stop kicks shot in the middle and the smaller part of the goal are that in about 76.2% (253 goals) were scored (Figure 1). The outcomes could be attributed that in maximum this strategy prevented the defender from getting close enough to the attacker to intercept the ball's trajectory. These results are agreed with Clemente, (2012) that the majority of the goals occur inside of penalty area and were scored from between the goal area and the penalty line. Additionally, the most successful teams scored most goals inside of the penalty area than other teams. These results demonstrate the relevance of achieving the penalty area in order to improve the opportunity to score. Therefore, possession with a high degree of ball control inside penalty area has the potential for producing quality shots Tenga et al., (2010).

By analyzing the area's parts of the court to determine from where the assists came to score goals. It can be seen that most goals were scored from open play from the second penalty spot in the line of goal and displays of the court 20 meters (Figure 3). Regarding to these results is possible to verify that the most goals were scored by attacking phase used more times the inside penalty area, especially external side of the court in order to afford the defensive line of the opponents. In the same way, the most attackers take advantage in the penalty area of the opponent to make more shots and increase the opportunity to score.

Therefore, the efficacy of the teams may relate to the quality to maintain the ball possession making short passes in order to decrease the unpredictability of the long and medium passes. Equally, the most successful teams show more shots in the penalty area. These effects may relate to the proximity of the target, trying to shorten the distance of the shot in order to increase the opportunity to score. From these findings, a style of play emphasizing movement of the ball into shooting positions in and around the penalty area quickly, using the fewest passes possible was recommended, with the idea being that the more times the ball entered these areas the more chance there was of scoring James, (2006). therefore, is possible to confirm that the penalty area is an important place where the goals are scored, and the most successful teams are more impermeable on this zone.

Through analyzing the results it is possible to understand that the most successful teams score more goals per game, existing significant differences between them (Table 2). Scoring goals is the primary determinant of success and as a result received extensive consideration in research e.g., Lago and Martín, (2007). In this way, the goals and the processes that generate goals need to be a focus of the analyses of the notational analyses.

The results from the present study indicate also that winning teams made more shots and shots on goal than losing teams. Moreover, winning teams had a higher effect than losing teams (Table 2). The greater numbers of shots on goal are more likely to finish in scoring. Hughes and Franks, (2005) indicated that there were differences between successful and unsuccessful teams in converting possession into shots on goal, with the successful teams having the better ratios. Peñas et al., (2011) showed that winning teams had significantly higher values than the other groups of teams for the following game statistics: shots on goal and strength. From this and from previous researches it can be concluded that the difference between winning, and defeated teams are mostly evident in shots on goal and in the efficiency of those shots on goal Grant et al. (1999). The results of the present study support the notion that winning teams are stronger in the variables related to goals scored than losing teams.

In this study, there was no significant difference in ball possession and corners between winning and losing teams (Table 2). Performance analyses studies have provided inconclusive information regarding the relationship between ball possession and competition success Hughes and Franks, (2005); Stanhope, (2001). Some authors have suggested the existence of patterns of play involving ball possession shown by successful and unsuccessful teams Hughes and Franks, (2005). While others indicate that ball possession time is not a marker of success in a game Stanhope, (2001). The reason for this is due to the different nature of play in Futsal than soccer. Specifically, in Brazil 2012 Generally, due to the improvement in physical endurance, defenses were more aggressive, trying to provoke opponents into making errors and to recover the ball as quickly as possible to launch dangerous counterattacks thanks to these improvements, we saw electrifying counterattacks, with defensive and attacking transitions mostly implemented in the correct way. We noted just a few matches in which a zonal defensive system was used instead of man-to-man defending FIFA, (2013). Future studies should address the relationship between ball possession and competition success and analyze the influence of situational variables (match location, match status and quality of opposition) on team possession.

The value of the data related to the game analyses, regardless of their significance, can serve as feedback information for coaches when planning and programming training activities, but not as the only source of information of competitive performance of individuals or the team. Application of the results, generated by such analyses, is primarily reflected in theoretical sense, and as such cannot be generalized so no conclusions should be made based on them related to Futsal game tactics on the global level.

CONCLUSION

The main objective of this study was to analyze the performance indicators and characterize of goals scored in the Futsal World Cup Thailand 2012. The results demonstrate that the frequency of goals scored during a match is time dependent, most goals were scored landing in the lower part of the goal from inside penalty area by set playing. The variables that better differentiate winning and losing teams in a global way were the following: goals scored, total shots, shots on goal and effectiveness.

Practical Application

Coaches should pay more attention to the later period of the match where most goals were scored. They should train their players better in order to confront fatigue in the later stages of the match, as well as prepare an effective tactical plan. The penalty area is an important place where the goals are scored. Thus, coaches should prepare goalkeepers to be concentrated all the time, especially with the lower part of the goal. Defenders must be close enough to the attacker to intercept the path of the ball. There is also a need to increase the speed of them as soon as possible to satisfy the required speed necessary to intercept the path of the ball, especially in the penalty area. For attackers, they must possess the ball with a high degree of control in the penalty area for producing quality shots to score goals. These results may relate to the proximity of the target, trying to reduce the distance of the shot in order to increase the opportunity to score. The results may be of use to coaches in terms of designing their training programs, providing them with information about what attacking players need to achieve, and what needs to be avoided defensively, if a team is to increase its chances of winning.

REFERENCES

Abt, G.A., Dickson, G, and Mummery, W.K. (2002). Goal scoring patterns over the course of a match: An analysis of the Australian National Soccer League. In W. Spinks, T. Reilly & A. Murphy (Eds.), Science and Football IV (pp. 106-111). London, UK: Routledge.

Acar, M.F, Yapicioglu, B, Arikan, N, Yalcin, S, Ates, N, and Ergun, M. (2009). Analysis of goals scored in the 2006 World Cup. In T. Reilly and F. Korkusuz (Eds.), Science and Football VI (pp. 235-242). London, UK: Routledge.

A´lvarez, JCB, D'ottavio, S, Vera, JG, and Castagna, C. (2009). Aerobic fitness in Futsal players of different competitive level. J Strength Cond Res 23 (7): 2163–2166.

Armatas, V, Yiannakos, A, Zaggelidis,G, Papadopoulou S,and Fragkos, N. (2009).Goal scoring patterns in Greek top leveled soccer matches. Journal of Physical Education a Sport Vol 23, no 2, June.

Armatas, V, and Yiannakos, A. (2010) Analysis and evaluation of goals scored in 2006 World Cup. Journal of Sport and Health Research, 2, 119-128.

Armatas, V, Yiannakos, A, Papadopoulou, S, and Skoufas, D. (2009) Evaluation of goals scored in top ranking soccer matches: Greek "Super League" 2006-07. Serbian Journal of Sports Sciences, 3, 39-43.

Bangsbo, J. (1994). The physiology of soccer - with special reference to intense intermittent exercise. Acta Phys Scand., 151 (Suppl. 619): 1-155.

Barros, R. M, Misuta, M. S, Menezes, R. P, Figueroa, P. J., Moura, F. A., Cunha, S. A., et al. (2007). Analysis of the distances covered by first division Brazilian soccer players obtained with an automatic tracking method. Journal of Sports Science and Medicine, 6, 10.

Carling, C, Williams, A. and Reilly, T. (2005). The Handbook of Soccer Match Analysis. London: Routledge.

Castagna, C, D'Ottavio, S, Granda Vera, J, and Barbero Alvarez, J. C. (2009). Match demands of professional Futsal: a case study. J Sci Med Sport, 12(4), 490-494.

Castellano, J, Casamichana, D. and Lago, C. (2012) The use of match statistics that discriminate between successful and unsuccessful soccer teams. Journal of Human Kinetics, 31, 139 – 147.

Clemente, F, M. (2012). Study of successful soccer teams on FIFA World Cup 2010, Pamukkale Journal of Sport Sciences , Vol.3, No.3, Pg:90-103.

Duarte, R, Batalha, N, Folgado, H ,and Sampaio, J. (2009). Effects of Exercise Duration and Number of Players in Heart Rate Responses and Technical Skills During Futsal Small-sided Games, The Open Sports Sciences Journal.

Frencken, W., & Lemmink, K. (2008). Team kinematics of small-sided soccer games. A systematic approach. In T. Reilly & F. Korkusuz (Eds.), Science and football VI (pp. 161–166). New York, NY: Routledge.

FIFA.(2013). FIFA Futsal World Cup Brazil 2008 Rapport technique et statistiques. Retrieved from, http://www.fifa.com/aboutfifa/footballdevelopment/technicalsupport/technicalstudygroup/menreports html

FIFA. (2013). FIFA Futsal World Cup Thailand 2012 Rapport technique et statistiques. Retrieved from,

http://www.fifa.com/aboutfifa/footballdevelopment/technicalsupport/technicalstudygroup/menreports.html

Grant, A.G., Williams, A.M., & Reilly, T. (1999). Analysis of goals scored in the 1998 World Cup. Journal of Sport Sciences, 17, 826-827.

Hughes, M, and Bartlett R. (2002). The use of performance indicators in performance analysis. J Sports Sci, 20: 739-54.

Hughes, M, Caudrelier T, James N, Redwood-Brown A, Donnelly I, Kirkbride A, and Duschesne C. (2012). Moneyballand soccer - an analysis of the key performance indicators of elite male soccer players by position. J. Hum Sport Exerc. Vol. 7, No. 2, pp. 402-412.

Hughes, MD, and Franks, IM. (2004). Notational Analysis of Sport 2nd Edition-better systems for improving coaching and performance. London: E. & F.N. Spon.

Hughes, MD, and Franks, I. (2005). Analysis of passing sequences, shots and goals in soccer. J Sport Sci, 23 (5): 509- 514.

James, N. (2006). Notational analysis in soccer: past, present and future. International Journal of Performance Analysis in Sport, 6, 67-81.

Jinshan, X, Xiaoke, C, Yamanaka, K, and Matsumoto, M. (1993). Analysis of the goals in the 14th World Cup. In T. Reilly, J. Clarys & A. Stibbe (Eds.), Science and Football II (pp. 203-205). London, UK: E. & F.N. Spon.

Lago, C, Lago, J, Dellal, A, and Gomez, M. (2010). Game-related statistics that discriminated winning, drawing and losing teams from the Spanish soccer league, J Sport Sci Med9, (2), 288-293.

Lago, C, and Martín, R. (2007). Determinants of possession of the ball in soccer. Journal of Sports Sciences, 25 (9), 969-974.

Leite, Werlayne S. S. (2012). Analysis of the offensive process of the Portuguese futsal team, Pamukkale Journal of Sport Sciences, 3 (3), pp. 78-89.

Luhtanen, P, Belinskij, A, Hyrinen, M, and Vnttinen, T. Comparisons (2001). Tournament Analysis Between the EURO 1996 and 2000 In Soccer. International Journal of Performance Analysis in Sport, volume 1, Number 1, July 2001, pp 74-82.

Marques J, N, K. (2009). The effect of the peripheral vision training of the quantity of actions during the attack of the indoor soccer. Brazilian Journal of Biomotricity, v. 3, n. 1, p. 40-55.

Michaildis Y, Michaildis C, Primpa E. (2013). Analysis of goals scored in European Championship 2012. J. Hum.Sport Exerc. Vol. 8, No. 2, pp. 367-375.

Njororai W. W. S. (2007). Scoring Goals: What the coach should know about the timing. Soccer Journal. November/December, 34- 36.

Njororai, W, W, S. (2013). Analysis of goals scored in the 2010 world cup soccer tournament held in South Africa, Journal of Physical Education and Sport (JPES), 13 (1), Art 2, pp 6 – 13.

Peñas, C, L, Ballesteros J,L, Dellal, A and Gómez, M. (2010). Game-related statistics that discriminated winning, drawing and losing teams from the Spanish soccer league, Journal of Sports Science and Medicine 9, 288-293.

Peñas, C, L, Ballesteros J,L, and Rey,E. (2011). Differences in performance indicators between winning and losing teams in the UEFA Champions League, Journal of Human Kinetics volume, 135-146.

Reilly, T. (2001). Assessment of sport performance with particular reference to field games. Eur J Sport Sci v. 1, p. 1-12.

Reilly, T. (1997). Energetics of high intensity exercise (soccer) with particular reference to fatigue. J Sports Sci., 15:257-263.

Reilly, T. (1996). Motion analysis and physiological demands. In T. Reilly, J. Bangsbo, & M. Hughes (Eds.). Science and football III (pp. 65-81). London: E. & F.N. Spon.

Roxburgh, A. (2008). The technician Futsal. Newsletter for coaches, UEFA.

Stanhope J. (2001). An investigation into possession with respect to time, in the soccer World Cup 1994. In M Hughes (ed): Notational Analysis of Sport III. Cardiff: Centre for Performance Analysis, UWIC, pp 155-162.

Suzuki, K and Nishijima, T. (2004). Validity of a soccer defending skill scale (SDSS) using game performance. Int J Sport Heal Sci v. 2, p. 34-49.

Taylor, J. B, Mellalieu, S. D, James, N, and Shearer, D. A. (2008). The influence of match location, quality of opposition, and match status on technical performance in professional association football. Journal of Sports Sciences, 26 (9), 885-895.

Tenga, A, Holme, I, Ronglan, L. T, and Bahr, R. (2010). Effect of playing tactics on achieving score-box possessions in a random series of team possessions from Norwegian professional soccer matches. Journal of Sports Sciences, 28 (3), 245-255.

Vilar, L , Araujo, D , Davids, K , Bar-Yam ,Y. (2010). Science of winning soccer, Emergent pattern-forming dynamics in association football, The Editorial Office of JSSC & Springer-Verlag Berlin Heidelberg.

Yiannakos, A. and Armatas, V. (2006). Evaluation of the goal scoring patterns in European Championship in Portugal 2004. International Journal of Performance Analysis in Sport (electronic), 6(1), 178-188.