
Match performances between Winning and Losing teams in the 2019 Netball Sabah Games

Siti Norashikin Mastun, Mohd Farik Madun & Abdul Muiz Nor Azmi*

Faculty of Psychology and Educational Studies, Universiti Malaysia Sabah,
Kota Kinabalu, Sabah, Malaysia

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Abstract

The current study aimed to identify performance indicators that may discriminate the match performances between winning and losing teams in the Netball Sabah Games 2019. A total of 16 matches during this tournament were recorded and analyzed manually by an observer. Ten performance indicators have been studied which were successful pass, turnover, offside, interception, deflection, defensive rebound, free pass, goal percentage, goal attempt, and goal. The results showed that there were significant differences in the interception, deflection, goal attempt, and goal between winning and losing teams ($p < .05$). In addition, the performance indicators that discriminate between winning and losing teams were the goal attempt and goal. These current findings may provide valuable information for coaches and players to create a useful strategy, especially when they are against a stronger opponent during the competition.

Keywords: netball; notational analysis; discriminant analysis; performance analysis

INTRODUCTION

Performance analysis has been used frequently in sports to provide quantitative feedback and crucial information regarding game statistics to coaches and teams (O'Donoghue, 2009). Performance analysis generally involves the analysis and evaluation of tactical, technical, physical, and cognitive indicators during training and competition, where these components can act as indicators that can influence team success (Bishop, 2008; Hughes & Franks, 2004). This analysis required a systematic observation where the coaches get the information through the visual feedback (video analysis) and use them to improve team performance and make good decision making during training and competition (O'Donoghue, 2009; Hughes & Franks, 2007). Performance analysis also allows coaches to identify strengths and weaknesses that are related to performance indicators between their teams and the opponent team (Carling, Reilly & Williams, 2008; Sgro, Barresi & Lipoma, 2015). Besides, coaches can use the information regarding the opponent's weaknesses by exploiting that information to win the game (Hughes & Franks, 2007).

Sports analysts always used notational analysis to measure team sports performance where they gather all the information regarding the team movement pattern and how the game pattern will influence the tactical and strategy during competition (Bartlett, 2001). Based on the data or game statistics obtained from the notational analysis, it has given space to sports scientists and coaches to explore more on a team and individual performance during and after a competition. In this case, they must know what kind of performance indicators that can bring a high impact on the team and individual performance. James (2006) stated that good performance indicators should consist of various aspects of skills or

performance variables that can bring team success. Therefore, the most important factor when analyzing team performance is to identify potential performance indicators that can improve team performance or vice versa (Hughes & Bartlett, 2002).

In netball, several performance indicators have been studied where it might influence team success during matches such as center pass, defensive rebound, interception, deflection, free pass, turnover, number of shots, and number of goals (O'Donoghue, Mayes, Edwards & Garland, 2008). The findings revealed that the top half teams perform a significantly greater percentage of shots and make more turnovers, especially in defensive rebounds and interceptions when playing against a bottom half team. The selected performance indicators in the study give opportunities for the top half team to win against the bottom half team. In football, a successful team has scored more goals, produced greater total shots, ball possession, and crosses than losing teams (Lago-Peñas, Lago-Ballesteros, Dellal & Gómez, 2010). A previous study also proved that indicators related to the offensive strategies and scoring opportunities were able to discriminate the performance between winning and losing teams (Sgro *et al.*, 2015).

Currently, there is a limited study from a performance analysis in netball. Previous studies have analyzed the differences in decision-making capabilities between expert and developmental athletes during netball matches (Bruce, Farrow, Raynor & May, 2009), performance norms in netball (O'Donoghue, Mayes, Edwards & Garland, 2008), the direction of turn when players received a center passes (Pulling, Eldridge & Lomax, 2016), and applying performance data to discover styles of play in netball (Croft, Willcox & Lamb, 2017). There is a little study focusing on match performance between winning and losing teams in netball matches and no previous study has examined the performance indicators that may discriminate the performance between winning and losing teams. Therefore, the study aimed to identify the performance indicators that can discriminate winning and losing teams in the 2019 Netball Sabah Games matches.

METHODS

Data Collection

All 16 matches of Netball Sabah Games 2019 were recorded and analyzed. Ethical approval was obtained from the Universiti Malaysia Sabah and the Sabah Sports Council (MSNS: 800-5/9 klt27) to conduct the recording for study purposes. There were eight teams participating in this tournament who were Keningau, Lahad Datu, Kota Kinabalu, Tenom, Kota Belud, Penampang, Sipitang, and Tongod. Teams were divided into two groups (Group A: Keningau, Tenom, Tongod, and Penampang; Group B: Lahad Datu, Kota Belud, Sipitang, and Kota Kinabalu). The top two teams in each group qualified for the next round, known as a knockout stage (semifinal and final/3rd place match). The tournament used a standard format competition and rules by the International Netball Federation (INF). A netball game in this tournament consists of four 15 minute quarters where teams will change ends each quarter.

Procedure

Notation analysis was completed on 16 matches; 12 games in the group stage and 4 games in the knockout stage. The recording for all matches was analyzed manually without using any software and it has been carried out by one observer only. The observer will analyze the video twice after he finishes recording all matches until the tournament reaches the final match. In the current study, a total of ten performance indicators known as variables were tabulated manually for each team who competed in this tournament. The variables were defined as follows:

Table 1: Variables studied in the Netball Sabah Games 2019

Variables	Description
Successful pass	A successful pass from teammates that received perfectly without any interception from the opponent.
Turnover	Situations where the team gains possession from the opponent as a result of making contact intentionally or unintentionally, a defensive rebound, a bad passing, or an interception during the game. The situations that can be considered as turnover in netball also include foul play like footwork, offside, out of court, or/and replay.
Offside	A player (with or without the ball) moves into an area of the court which their position does not allow them to play in.
Interception	Player takes the ball in open play and they gain possession from the opponent. It can happen when the players make the intercept from the opponent pass as it may not reach their teammate during the game.
Deflection	A defensive play by outstretched players' hands off the ball to gain possession from the opponent.
Defensive rebound	The opponents' attempt to score does not result in a goal in which the defender from the opponent gains possession and controls the ball.
Free pass	The opponent loses their possession due to the foul play and the umpire gives a free pass to the team.
Goal attempt	The number of shots executed by attacking players (GA or GS) regardless of the result whether it is resulting in a score or not.
Goal percentage	Percentage of shots that are goals.
Number of goal	A successful shot or attempt that is resulting in a score for the team.

Reliability

The percentage error has been calculated (see Table 2) to evaluate the intra-rater reliability of nominal variables in the performance indicators that computes by a single rater or observer (Hughes, Cooper & Nevill, 2002; Hughes & Franks, 2004). The percentage error formula as follows:

$$\text{Percentage error} = 100 \times |V1 - V2| / ((V1+V2)/2)$$

An observer has analyzed a netball match via video replay. The measurement for all variables has been done twice on different days, 48 hours after the first measurement was performed (De Vet, Terwee, Knol & Bouter, 2006). The match and team who competed in that video were the same as the first measurement was performed. The percentage error values were less than 5% is considered well enough for the performance indicators evaluations achieved by the observer (Cooper & Neville, 2004; Hughes, Lipoma & Sibilio, 2010; Sgro et al., 2015).

Table 2: The results of the intra-rater reliability using the percentage error

Variables	Team A			Team B		
	1 st	2 nd	% Error	1 st	2 nd	% Error
Successful pass	60	59	1.7	48	47	2.1
Turnover	18	18	0.0	15	15	0.0
Offside	4	4	0.0	8	8	0.0
Interception	6	6	0.0	4	4	0.0
Deflects	20	20	0.0	12	12	0.0
D. Rebound	10	10	0.0	15	15	0.0
Free pass	27	27	0.0	29	27	3.6
Goal attempt	34	33	3.0	29	28	3.5
Number of goal	27	27	0.0	21	21	0.0

*Evaluation between the 1st measurement and 2nd measurement.

Statistical Analysis

A descriptive analysis of the data was reported as mean and standard deviation (mean ± SD) for each parameter. As several performance indicators calculated were non-normally distributed, a Mann-Whitney U test was performed to analyze the differences between winning and losing teams. Lastly, a discriminant analysis was conducted to identify which of the performance indicators may discriminate the performances between the winning and losing teams. The value of structure coefficients (SC) has been used to determine the factors that discriminate against the winning and losing teams where are greater than or equal to .30 (Tabachnick & Fidell, 2007). All the data were analyzed using SPSS version 26 and the level of significance was set at $p < .05$.

RESULTS

Table 3 displays the results of the descriptive analysis (mean ± SD) and Mann-Whitney U test for the game performance indicators between winning and losing teams.

Table 3: Differences between winning and losing teams in game statistics from Sabah Games

Variables	Winning	Losing	<i>P</i> Value
Successful pass	89.4 ± 4.9	86.4 ± 3.9	.066
Turnover	14.5 ± 4.4	14.8 ± 5.1	.854
Offside	18.0 ± 3.0	20.0 ± 3.2	.562
Interception	13.1 ± 5.4	7.0 ± 4.0	.001*
Deflection	25.0 ± 6.3	14.0 ± 5.0	.002*
Defensive rebound	24.0 ± 8.4	18.6 ± 6.7	.062
Free pass	39.5 ± 10.7	41.2 ± 12.2	.107
Goal attempt	81.0 ± 18.2	51.0 ± 11.8	.000*
Goal percentage	66.3 ± 8.22	60.8 ± 8.7	.085
Number of goal	54.4 ± 15.9	30.7 ± 7.3	.000*

*Significant at $p < .05$

Based on the descriptive statistic in Table 3, the winning and losing teams almost had a similar number of successful passes during the tournament where the winning teams executed a slightly higher than losing teams [$Z = -3.641, p > .05$]. Next, both teams also produced a similar average of turnover during the tournament [$Z = -1.351, p > .05$]. There was no significant difference in offside played between both teams [$Z = -6.211, p > .05$]. Winning teams had significantly higher means for the variables of interceptions [$Z = -3.131, p < .05$] and deflections [$Z = -5.312, p < .05$]. For a defensive rebound, there was no significant difference between winning and losing teams [$Z = -4.109, p > .05$]. In contrast, the losing teams recorded a slightly higher free pass compared to winning teams [$Z = -8.351, p > .05$]. Results also revealed a significant main effect for goal attempt where the winning teams recorded a greater goal attempt compared to losing teams [$Z = -3.421, p < .05$]. For the percentage goal, there was no significant difference between winning and losing teams [$Z = -1.831, p > .05$]. Lastly, the winning teams had significantly higher in variable number of goals than the losing teams [$Z = -2.103, p < .05$].

The discriminant analysis was performed to identify which performance indicators may discriminate the performance between winning and losing teams. The discriminant analysis displayed a significant level of relationship between the status of the team (winning or losing teams) and the performance indicators, contributing for 90% of the matches result variability. The discriminant function model had the following characteristics: Wilks's $\lambda = .411, \chi^2(9) = 22.70, p = .007$, eigenvalue = 1.436, canonical correlation = .768. A structure matrix revealed that the most significant predictors were the goal attempt (SC = .84) and the number of goals (SC = .82). In the classification results, 84.4% of original grouped cases correctly classified with the losing result classified were higher (93.8%) than the winning result (75.0%). The results in cross-validated statistics also showed that the losing team

(81.3%) was better classified than the winning team (68.8%). Table 4 shows the classification results of the discriminant function model.

Table 4. Classification results of the discriminant analysis

	Match result	Predicted Group Membership (%)	
		Winning	Losing
Original	Winning	75.0	25.0
	Losing	6.3	93.8
Cross-validated	Winning	68.8	31.3
	Losing	18.8	81.3

DISCUSSION

The present study aimed to investigate the match performance characteristics which can explain the discrimination between the winning and the losing teams in the Netball Sabah Games 2019 tournament. The findings showed that the winning teams produced significantly greater interception, deflection, goal attempt, and goals, but fewer free passes compared to their opponent teams that lost the match. Based on this result, we can see that the winning teams have displayed a better performance during a tournament where they can defend well in all matches. The winning teams are more likely to play a hard defense where it led them to get a higher number of interceptions and deflections in this tournament. By making a hard defending, the players will need to make a close marking to their opponent. It may cause their opponent to feel distracted by producing a loose play and lack of focus during the game (Galsworthy, 1996; O'Donoghue, Mayes, Edwards & Garland, 2008). Moreover, a successful interception is also related to players' ability to read and anticipate the opponent's movement (Galsworthy, 1996; O'Donoghue *et al.*, 2008).

The winning teams may also be good in their tactical play when they make the interception and deflection which leads them to make smoother transitions from defense to attack (Woodlands, 2006). As the winning teams can switch their tactical play from defense to attack very well, they also manage to create more goal attempts that led to a higher number of goals. However, the goal accuracy by attacking players from winning teams was moderate, as their goal percentage was slightly higher than losing teams. The coaches from both teams might need to take this factor into their account in which they need to improve their attacking performance by making sharp shots during games. High pressure from the opponent might increase the difficulty level for goal shooters to make an accurate goal during the match. Therefore, the players need to keep their composure in these situations by making the right decisions, especially when choosing appropriate types of shots to increase the shot accuracy which can lead them to get a higher number of goals (Langford, 2014).

In addition, the results from the present study found that there were no differences in successful pass, turnover, offside, defensive rebound and free pass between winning and losing teams. The previous study shows that these indicators may differentiate against the performances between winning and losing teams (Croft, Willcox & Lamb, 2017; Csataljay, O'Donoghue, Hughes & Dancs, 2009; Lago-Penas, Lago-Ballesteros & Rey, 2011; Mclean, Hulme, Mooney, Read, Bedford & Salmon, 2019; O'Donoghue *et al.*, 2008; Ortega, Villarejo & Palao, 2009). The result of discriminant analysis showed that the indicators that related to scoring opportunities which were goal attempt and number of goals were able to discriminate the performance result between winning and losing teams in Netball Sabah Games 2019. This finding is supported by other studies in which the indicators correlated with goals and shots on goal has been a key element for a team to win their match (Lago-Penas *et al.*, 2011; Njororai, 2014; Sgro *et al.*, 2015).

CONCLUSION

The current study adds to sports notational analysis in netball by demonstrating the performance indicators that can discriminate team performance between winning and losing teams. More specifically, our data indicated that winning teams had a better performance against losing teams in most of the game statistics. The performance indicators related to tactical and technical strategies play an important role as they can highlight good or bad techniques or team performances (Bartlett, 2001). A good selection in performance indicators may facilitate the coaches to create a good game strategy and help them to make decisions in-game tactics (Araujo, 2016; Hughes & Bartlett, 2002). Further research might explore the game performances in all positions in the netball team. It would give a good advantage for a team to discover which positions have a good or bad performance based on their game statistics.

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✉ Abdul Muiz Nor Azmi
Faculty of Psychology and Educational Studies,
Universiti Malaysia Sabah,
Kota Kinabalu, Sabah,
Malaysia
Email: imanmuiz94@gmail.com