ABSTRACT

The aim of this particular study was to investigate the differences in penalty corner execution between winning and losing in TNB Women Malaysian Hockey League. data was collected and extracted from the National Women Hockey League 2016. The data consist of twenty (20) matches of league game and five (5) matches of knock-out game for cup game, all utilised by computerized software *Gamebreaker* (Hudl, USA). A total of 195 penalty corner, have been analysed, which were consists of 148 penalty corner from the winning team and 97 penalty corner, respectively, from the losing team. From the selected performance indicator (P.I) that have been categorized was to find out which performance indicators affect high influent in executing the penalty corner in the tournament which are types of shot, shot attempts and shots target. A descriptive statistics was first carried out for all the match and it had been concluded into an overall descriptive statistics. For inferential statistics, the parametric statistical test which is paired-sample t-test was used to compare the differences of performance indicators between winning and teams in terms of penalty corner execution. The result showed that there were only three selected performance indicators out of ten that show a statistical significance difference. There were drag flick shot ($p < 0.000$), goal scored ($p < 0.000$) and shot on target ($p < 0.000$). While other seven (7) performance indicators show no statistical significance different which were direct hit ($p < 0.852$), deflection ($p < 0.247$), tap ($p < 0.161$), saved shot ($p < 0.085$), blocked shot ($p < 0.692$), missed shot ($p < 0.244$) and shot off target ($p < 0.214$).

ABSTRAK

Tujuan kajian ini adalah untuk mengkaji perbezaan pelaksanaan sudut penalti antara pasukan menang dan pasukan kalah dalam Liga Hoki Wanita TNB. Data telah dikumpulkan dan diekstrak dari Kejohanan Liga Hoki Wanita Kebangsaan 2016. Data terdiri daripada dua puluh (20) perlawanan liga dan lima (5) perlawanan kalah mati untuk kejohanan merebut piala. Semua kajian adalah menggunakan perisian berkomputer Gamebreaker (Hudl, Amerika Syarikat). Sebanyak 195 pukulan sudut penalti, telah dianalisis, yang terdiri dari 148 pukulan sudut penalti dari pasukan yang menang dan 97 pukulan sudut penalti, masing-masing, dari pasukan yang kalah. Dari petunjuk prestasi terpilih yang telah dikategorikan adalah untuk mengetahui petunjuk prestasi mana yang mempengaruhi dengan tinggi dalam melaksanakan pukulan sudut penalti dalam kejohanan yang merupakan jenis-jenis percubaan, percubaan pukulan dan sasaran pukulan. Statistik deskriptif pertama kali dilakukan untuk semua perlawanan dan akan disimpulkan menjadi statistik deskriptif secara keseluruhan. Untuk statistik inferensi, ujian statistik parametrik yang merupakan 'paired-sample t-test' digunakan untuk membandingkan perbezaan petunjuk prestasi antara pasukan menang dan pasukan kalah dari segi pelaksanaan pukulan sudut penalti. Hasil kajian menunjukkan bahawa hanya terdapat tiga petunjuk prestasi terpilih dari sepuluh yang menunjukkan perbezaan kepentingan statistik. Terdapat pukulan 'drag flick' ($p<0.000$), gol dijaringkan ($p<0.000$) dan pukulan tepat ke sasaran ($P = 0.000$, $P<0.05$). Walaupun tujuh (7) petunjuk prestasi lain tidak menunjukkan perbezaan statistik yang berbeza dengan pukulan terus ($p<0.852$), deflection ($p<0.247$), ketuk ($p<0.161$), pukulan yang diselamatkan ($p<0.085$), pukulan yang dihadang ($p<0.692$), pukulan yang tersasar ($p<0,244$) dan pukulan tidak tepat ke sasaran ($p<0.214$).

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APPROVAL

The Examination Committee has met on **14ᵗʰ July 2021** to conduct the final examination of **Aizuddin Amri bin Zainuddin** on his degree thesis entitled '**Analysis of Differences in Penalty Corner Pattern Between Winning and Losing Team in Women Malaysia Hockey League**'.

The committee recommends that the student be awarded the Master of Science.

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Title   : Analysis of Differences in Penalty Corner Pattern Between Winning and Losing Team in Women Malaysia Hockey League

Academic session   : March 2019

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TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1   Background of the study

The Olympic Game has been one of the largest athletic competitions since most countries worldwide. Field hockey is one of the Olympic Games sports that will be contested and that is why this sport is very well-known and becomes one of the sports that are important to Malaysia in searching for the first-ever gold medal in history. In most of the game that happens in the world, winning would become top priorities in their goal preparation. Different approaches, like the coaches physically and psychologically, either in the preparation or in the competition to find victory, but in some situations, they require something that will improve the team performance as a whole.

Field hockey is known as one of the most popular sports that have been played across the world. It can be considered a popular sports since there are more than 127 countries around the globe playing field hockey and these what make it one of the

world's most famous sports (Viswanat and Kalidasan, 2013). Basically, hockey consists of three categories of sports which are field hockey, indoor hockey and ice hockey (Utomo, Kusnanik, and Fuad, 2019). As for the field hockey particularly, Mosquera, Molinuevo, and Román (2007) suggested that it has two versions of play which requires different surfaces such as normal grass on thousand years back and synthetic turf in recent years until now.

Similar with other sports nowadays, field hockey too has been evolving from where it started. Field hockey is a sport with a history that over the last decade has evolved very rapidly and dramatically, shifting the technological, tactical and physiological needs, especially in the elite sphere (Manna, Khanna, and Dhara, 2009). Sunderland, Bussell, Atkinson, Alltree, and Kates (2006) stated that the offside rules in field hockey have been amended together with other rules due to the new development of the advance technology used on the pitch which has ingested the modern style of play in field hockey.

Despite of sharing some similarities with other sports in terms of goal scoring and style of play, it requires additional equipment to play especially the goal keeper. It is a very technical sport that needs great skill since the hockey stick is involved, as well as the ball and its speed (Hassan, 2010). Higher team effort tolerance and requiring optimum conditioning make this sport is a very dynamic game and been played by both gender as suggested by Viswanat and Kalidasan (2013). Utomo et al. (2019) also recognised hit, slap hit, reverse hit, flick, drag flick, scope and the dribble as basic techniques that should be acquired by the field hockey players.

There are few categories that distinguished the game. Game categories are classified into three groups, which are net and wall games, invasion games, and ground/field game where field hockey was in the genre of goal-striking invasion game (Hughes and Bartlett, 2002). In this sport, one individual or a team must surpass the other team both in terms of skill and tactical to gain the advantage during the game (Septianingrum, Sugiyanto, and Kristiyanto, 2018). Rosalie et al. (2017) stated that, in certain targeted invasion games like a field hockey, the opportunity to score a penalty is also a requirement for success.

On the other hand, Lago-Peñas and Gómez-López (2014) found out that in sports must have various options of tactics that can be changed during the match to gain advantage in game state which can lead to victory. They also stated that state of the is a mixture of the score line, advantage in numbers, remaining time and about how the game comes in present form. Quality performance is a strong source of assumptions regarding effectiveness, and those standards dictate the task-related energy that needs to be invested. In competition, the score line can be used as an indicator of success and therefore, can affect a player's effort (Lago-Peñas and Gómez-López, 2014).

The criteria to evaluate the performance is the ball should be strikes into the goal post as it is a target-oriented sports (Eskiyecek, Bingül, Bulgan, and Aydın, 2018). Simple information can be defining and describe a particular performance using match indicator from invasion game obtained from performance analysis. Field hockey in a field is a sport with certain tactical and logistical parallels to football as per suggested

by J. Lythe (2009) and a quick moving game involving a precise timing in throws and goals (Sofwan, Norasrudin, Redzuan, and Mubin, 2012).

Same like football, field hockey is played by 11 players, including one goalkeeper who is come with special padding and 5 players will sit on the bench. Rosters are 16 players, maximum with an unlimited number of substitution based on coaches' strategy. The duration of field matches consists of four 15-minutes periods with 2-minutes interval in between period 1 and period 2, 10-minutes interval between period 2 and period 3 and another 2-minutes interval within period 3 and period 4. The teams will change side after period 2 ends. The team get most goal scores after 4 periods is the winner with 3 points while the loser gets no point and as for group stages, the teams who are tied sharing 1 point. Meanwhile, when a tied game occurs during the knockout stages, winner will be decided by playing penalty shoot-out. According to Morencos et al. (2019), before these rules are been applied in 2014, International Hockey Federation (FIH) were applying two halves of 35-minutes as for duration play in field hockey.

In order to win the match in field hockey, one team have to score goal more than the opposite team. There are many ways to score field hockey goals through the field goal, penalty stroke, and penalty corner. Sunderland et al. (2006) define field goal as open-play goals which are considered like every other goal scored. The penalty corner is one of the most critical field hockey game scenarios because one-third of the goals that have been reached (Subijana, Gómez, Martin-Casado, and Navarro, 2012). As per

stated by Rosalie et al. (2017), the penalty corner plays an important role as one of the option to score a goal.

Penalty corner is awarded to the offensive team due to foul by the defending team who committed foul between the 23 metre line within the circle or an unintentional foul inside the circle (Ruscello, Mitrotta, Dring, Partipilo, and D'Ottavio, 2016). It should be played by pushing the ball to the stopper who is going to stop the ball outside of the circle and the striker, who can be either a flicker or hitter (direct hit or slap hit) to strike the ball towards the goal post (Ruscello et al., 2016).

The chances of goal scoring can be increased by utilizing the information during that particular situation, including the number of stoppers used and the method of playing (Moon, Park, and Kang, 2018). Sunderland et al. (2006) suggested that penalty corner features well-rehearsed procedure to perform it in perfect execution. It also allows coaches and players to carefully perform the appropriate strategy required by evaluating rival team's offensive and defensive penalty corner tactics.

In terms of statistical data in a real competition and tournament in field hockey, according to Mosquera et al. (2007), field hockey goals are accomplished in 58 per cent through strategic actions, where 44.6 per cent of the strategic activity of the penalty corner is the gateway to the goal result. This is the most significant and relevant behaviour in field hockey, in order to win matches with it, it is most important to devote hours of preparation so that it is carried out positively.

The data were based on 289 goals that been scored in 2003-2004 season across different competition in the whole season. During Olympic Games in London 2012, there were about 37.3% goal scored by men team were come from penalty corner and 50.1% goal scored by women team come from the same situation (Rosalie et al., 2017). In addition, during World Cup 1998, penalty corner specialist was brought in to substitute other players only during the penalty corner situation not only on the offensive situation. Substituting other players with penalty corner specialist can increase the scoring chances during offensive situations, but also during the defensive situation to decrease the goal scoring opportunity of the offensive sides (Laird and Sutherland, 2003). The specialist in penalty corner has been proven to become the most valuable assets to the respective team,

However, according to Laird and Sutherland (2003), FIH had disallowed this approach to let the specialist substitute the other players immediately after penalty corner been awarded as it can be advantageous on the one side only. These show how crucial the penalty corners to the field hockey team during the matches. Both coaches and players must know the most useful approach in executing the set-pieces to increase the goal scoring opportunity.

In this particular case, players prefer to use the technical aspect that is drag-flick in the penalty corner. The drag-flick is used for pace and precise target shooting (Subijana, Juárez, Mallo, and Navarro, 2010). Since it has been highly contributed to the goal scoring opportunity, drag flick has been recognised as crucial tool in executing penalty corners as per suggested by Hussain, Ahmed, and Khan (2020).

In the 1996 Atlanta Olympic Games, 38.1% (men's class) and 37.8% (women's class) of goals were scored through the penalty corner. 8.4% of men's penalty corner fired using this technology and 24.2% of experiments were scored in the same competition. The number of women who fought in the penalty corner using this technique declined (4.4%) and their targets (12.8%) (Perez, Olmo, and Acero, 2005). Although playing on the synthetic surface makes any kind of shots, it is strongly not recommended to drag flick in if field hockey is played on grass because there are high rates of friction relative to the synthetic surface (Sunderland et al., 2006).

There is another options of executing the penalty corner in the field hockey game than the drag-flick method. Before the penalty corner was taken, it was lined up by the offensive set-pieces. These techniques were designed to confuse opponents who typically believe that drag-flick is going to be done. The technique of push and strike is applicable and it will improve the chances of scoring goals.

1.2 Problem Background

There are different ways of scoring a goal in the penalty corner from drag flick to tactical setting. According to Hassan (2010), the application of technical skills in sports help in the evaluation of ability features and the development of effective mechanical efficiency principles, as well as the identification of elements that influence motor performance. This means that athletes prefer to use the associated expertise to improve skill execution by applying the technical applications.

The penalty corner makes it possible for a player to take possession of the ball near the goal post of the opposition and perform a set play assault on the goal. The penalty corner drag flick is relatively well qualified in the penalty corner. This strategy can lead to goal scoring opportunity when the attacking team does well and requires just three pushers, stoppers, and striker players (Mosquera et al., 2007). However, the short corner is not a skill, according to Mclaughlin (1997), that is easily mastered and requires daily and consistent training.

In the meantime, during the 1994 Field Hockey World Cup, drag flick isn't the skills that been used the most during the tournament. Just 79 times, the goal was scored via the drag flick out of 360 penalty corners awarded, while hit and push tactics managed to score 107 times out of 360 penalty corners in the competition (Mclaughlin, 1997). On the other hand, the mixture of both tactical and technological applications that play like a 'hit and drive' for drag-flick and set-pieces is also the perfect way to score a field hockey goal. That is because the number of goals scored is very high from the dead ball scenario like a penalty corner (Subijana, Juárez, Mallo, and Navarro, 2011).

On the other hand, in one field hockey match, there will be either a winning and losing team unless the match ended with draw result. According to Eskiyecek et al. (2018) to determine which team has won against the other side, the ball should be strike into the goal post as it is a goal oriented sports and it should be greater than its opponent. Lythe and Kilding (2013) field hockey requires certain tactical and playing pattern which will differentiate between winning and losing team.

Laird and Sutherland (2003) stated that penalty corners are very crucial as it can affect the result of the matches. They also found out it has become the very useful strategies for the coaches and players to construct the best tactical application in enhancing the goal scoring opportunities. These show the importance of penalty corner execution in determining the outcome of the particular match since it has a greater impact.

1.3   Problem Statement

The penalty corner is one of the most relevant field hockey game scenarios due to the fact that one-third of all goals arising from this particular situation. It also does not have the specific number of players who can participate in that situation unlike the defender teams who are limited to the maximum five players including the goalkeeper. This fact suggests that one of the most relevant performance indicators in deciding the gaps between winning and losing teams in the field hockey tournament is the penalty corner since there are numerical advantage for the attacking team.

There are researchers found out that it only takes roughly about 1.9 seconds and 2.3 seconds respectively by men and women team in order to complete the whole process of penalty corner execution. These are the situation wheres the attacking team need to complete the penalty corner by converting these chances to score a goal since the other defenders outside the circle can quickly enter the D box to help defending their goal post.

Hence, it is crucial for the team to execute penalty corner well to increase the chances to get goals. The attacking team also should understand the most useful method in executing the penalty corner and determine the most effective ways in taking advantage of that kind of situation.

1.4   Research Objective

The aim of this particular study was to investigate the differences in penalty corner execution between winning and losing in TNB Women Malaysian Hockey League. However, the objectives of the research were meant to answer all the research questions that arise throughout the whole study. Thus, the research objectives for the particular study were as follows: -

a)   To identify the penalty corner execution of the winning team.

b)   To analyse the penalty corner execution of the losing team,

c)   To investigate the differences in penalty corner execution between the winning and losing team.

1.5   Research Question

In order to conduct a research, there are few questions arise that need to be answered. The research questions for this particular study as per mention below: -

a)   How does the winning team execute the penalty corner?

b)   How does the losing team execute the penalty corner?

c)   What is the pattern of the penalty corner execution among women hockey team?

1.6   Significance of Study

Field hockey consider as not one of the popular research area, so, this particular research was significant in helping the field hockey personnel to determine the most effective way of scoring a goal via penalty corner especially among the women team. The findings of this study, along with the latest studies in this specific field could assist coaches and athletes to have some basic information suitable for training or tournament purposes in terms of performing the right penalty corner techniques to increase performances.

The coaches and players could use this information to concentrate a portion of the training time in order to perfect those skills. Such skills could be built in players interested in taking penalty corners so that each corner could be a possible chance for scoring goals. Coaches should promote strategies that are likely to lead to goal scoring, and prohibit non-goal strategies.

In addition, the coaches will also use it to assess the sequence of penalty corners and it will not only aid when the offensive condition is offensive, but it can support the team when the defence against the penalty corner sets pieces since only five

defenders including goal keeper with padding were allowed during the situation against the unlimited number of allowed attackers.

1.7 Definition of Terms

1.7.1 Winning and Losing Team

Winning team is a team who won the match regardless of which club or state they representing while losing team is a team who lost the repective match. In one field hockey match, there are three possibilities that could happen to the participating team which are win, lost or draw. Team who is score more goals than the other side will win the game while team who score less goal lost the game. If the match ended with both team score same amount of goal or tied without a single goal, the match is draw. However, the drew match will only happen in the group games and it will be no drew match once knockout round is been played.

1.7.2 Penalty Corner

It is awarded to the offending team when the defending team committed a foul in its circle or particularly bad foul in its defending quarter. The offending teams keenly seek after this penalty corner since it offers great scoring opportunities. When it is occurring, five defending players include the goal keeper are the players who are allowed to defend their goal post while the other six players must be stay at the centre of the field. As for the attacking team, there is no limited number of players to be allowed within the circle during penalty corner.

1.7.3   Type of Shot

There are four type of shots in execution penalty corner which are drag flick, direct hit, defelection and tap shots.

a)   Drag flick

This is the most skill that been used by players when executing penalty corner. This technique comprises a player who hangs on the shaft of the hockey stick and picks it up. The ball is then pushed along the ground while a slinging motion is being taken on the stick. This helps to speed up the ball that is freed up in an often elevated direction. As in penalty corner, player can lift the ball higher than the backboard of the goal post.

b)   Direct Hit

This is the skill whereas player will striking the ball with the stick swinging to the ball and it will produce high ball's velocity. It has been used a lot in field hockey both in open play and penalty corner. However, in penalty corner situation, players are not allowed to lift the ball higher than the backboard.

c)   Deflection

A shot in which the shooter alters the path of the passed ball without really stopping or trapping it. This skill requires more than one touch after the ball has been stopped by the stopper outside the D circle and there will be one player to pass the ball in

specific direction whereas another attacking player will going to deflect the ball into the goal post.

d) Tap

This shot is been used when involve passing sequence in the D circle when executing the penalty corner. It also normally used when ball is rebounded by the goalkeeper after the ball has been saved.

1.7.4   Shot Attempt

There are four shot attempts in field hockey especially when executing the penalty corner. It is basically the outcomes of the shot that been striked during penalty corner. There are goal scored, saved shot, blocked shot and missed shot.

a) Goal Scored

Goal scored is where the ball is clearly going into the goal post without any foul committed by the attacking team and being confirmed by the whistle blew by the umpire.

b) Saved Shot

Any shot is being saved by the goalkeeper at any direction or shot saved on the line by the defenders. Normally it will resulted with long corner or another penalty corner if there is violation of rules occur during the save.

c) Blocked Shot

Block is perform by the first runner of the defender. Any shots that being blocked by defender in the D circle during penalty corner is consider as block.

d) Missed Shot

Attacking team tend to missed the shot when stopper cannot stop the ball properly outside the circle which can cause the ball travel away. It also a missed shot once attacking team is committing a foul or violating the rules when performing the penalty corner.

1.7.5 Performance Indicator

Performance indicator is the metric that represent the variables in one sports when analysing the performance. By understanding the performance indicator for specific sports, it can help in improving the team performance. As for the penalty corner, performance indicator should related to that specific situation which can lead into gaining information to change the match outcomes.

CHAPTER 2

LITERATURE REVIEW

2   Introduction

The issue that is not clear about the successful ways of scoring a goal during the penalty corner between the tactical application that is 'set-piece play and the technical application for both winning and losing team was addressed in the previous chapter. This form of issue thus needs a clearer approach in order to make it understandable and to discover successful ways to improve it better.

Based on the issue arised, the researcher makes a few conclusions that during the penalty corner to score a goal, there were significance difference in pattern of play for both winning and losing team which can determine the result of particular match. The researcher also believes that during the penalty corner, there are significant impacts between selected performance indicators in differentiate the winning and losing team.

The previous research undertaken by the existing investigator will be addressed in this basic chapter. The goal of this chapter is to explore the key issues explored in the theoretical sense, including the methods, instrumentation, perception and history