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The Creation of Goal-Scoring Opportunities at the 2019 FIFA Women's World Cup

by
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The aim of this study was to analyse how goal-scoring opportunities (GSOs) were created at the 2019 FIFA Women's World Cup. The sample consisted of 868 GSOs that led to a shot at the goal throughout all 52 games during the tournament. All games were downloaded from the InStat platform. Descriptive statistics, chi-square of association and binary logistic regression analysis were used to analyse the data. Of the 868 GSOs, 81 (9.1%) resulted in goals. A significant association was observed between GSOs and the type of attack (χ^2=6.38, p=0.01, V=0.09), with more goals being scored from a counter-attack (12.7%) than an organised attack (7.5%). Counter-attacks recorded a higher odds ratio in univariate analysis (OR=0.56; 95%CI:0.35–0.88; p=0.01) than in multivariate analysis (OR=0.46; 95%CI:0.28–0.76; p=0.002). The multivariate analysis further indicated a significant probability of scoring when ball possession started in the middle third of the field (OR=0.19; 95%CI:0.44–0.88; p= 0.01). The current study has practical implications for soccer coaches to develop and implement training sessions to improve goal-scoring chances of women's teams at international competitions.

Key words: *counter-attack, organised attack, passes, attacking, defending.*

Introduction

The popularity of women's soccer is growing considerably, and it is becoming an internationally competitive sport (Scanlan et al., 2020). As a result, research into the women's game has started receiving great attention among scholars in the last decade (Alcock, 2010; Beare and Stone, 2019; Kubayi and Larkin, 2020; Scanlan et al., 2020). The most studied areas in the scientific literature examining women's soccer include, but are not limited to, motion analysis of the physical demands of the game (Vescovi and Falenchuk, 2019), match statistics (Kubayi and Larkin, 2020), set pieces (Alcock, 2010; Beare and Stone, 2019), injuries (Ibikunle et al., 2019) and physical fitness (Emmonds et al., 2019). However, there appears to be few published studies of the women's game that describe effective offensive strategies leading to the creation of goal-scoring opportunities (GSOs) and goals (Scanlan et al., 2020).

One of the few published studies was carried out by Konstadinidou and Tsigilis (2005), who analysed the offensive plays of four top teams (i.e., Brazil, China, Norway and USA) during the 1999 FIFA Women's World Cup. The study found that the main source of Brazil's scoring attempts came from the right offensive zone, using a combination of individual actions and short passes. The scoring attempts of China were executed from the central and left zone using a combination of two or three short and medium-range passes. Norway's scoring attempts were executed through short possession with long balls starting from the defending zone and directed towards the opponent's half. The USA's scoring attempts came from the central zones, using short ball possession with short and medium-range passes (Konstadinidou and Tsigilis, 2005).

While Konstadinidou and Tsigilis's (2005) study provided baseline information on goal-

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scoring attempts in women's soccer, it was limited to four teams playing in 20 matches of the tournament. In view of the limited number of teams and games selected (or available) for analysis, it is essential to analyse all matches from the tournament in order to provide a true reflection of GSOs across the whole competition (Kubayi and Larkin, 2019). It should also be noted that Konstadinidou and Tsigilis's study consisted of the data for a tournament played over 20 years ago, and the game of soccer has evolved in terms of rules, the style of play, formations and technological advances (e.g., video assistant referee) (Kubayi and Larkin, 2019; Wallace and Norton, 2014).

Mara et al. (2012) also investigated attacking strategies leading to GSOs in high-level women's soccer. The results indicated that 24% of goals resulted from crosses. The findings further showed that attacking through the wide areas of the field was the most effective strategy for creating GSOs in women's soccer. Ibáñez et al. (2018) explored the impact of scoring first on the final match outcome during the 2015/2016 Spanish women's soccer league season. It was found that scoring first increased from 2.8 to 11.1 times the winning chances. The authors further indicated that the better the ranking position, the higher the chances to score first. However, the aforementioned studies were limited to a domestic league competition, and previous studies have demonstrated that the playing styles are different between competitions (e.g., domestic vs. international competitions) (Gómez et al., 2013; Kubayi and Larkin, 2019).

More recently, Scanlan et al. (2020) investigated factors related to the creation of GSOs at the 2015 FIFA Women's World Cup. The findings showed that from 390 GSOs, 95 resulted in a goal being scored, while 295 of these attempts were unsuccessful. A significant difference was observed between the various zones of possession gain leading to the creation of GSOs. The areas where GSOs most commonly began was in the three midfield zones (midfield right 13%; midfield centre 27%; midfield left 16%) and the attacking centre zone. The most commonly observed type of possession leading to GSOs was due to a misplaced pass or an interception (Scanlan et al., 2020). However, their study only considered shots deemed to have been on the target, which may

not constitute a complete representation of GSOs across the tournament.

In light of the limitations of previous studies examining women's soccer (i.e., Konstadinidou and Tsigilis, 2005; Mara et al., 2012; Scanlan et al., 2020), the current study seeks to provide a true representation of how GSOs were created at the 2019 FIFA Women's World Cup. Such research may help women's soccer coaches in developing and implementing offensive strategies to enhance the chances of scoring goals in elite international competitions.

Methods

Sample and data source

Match data were collected from all 52 games played during the 2019 FIFA Women's World Cup. All games were downloaded from the InStat platform and subsequently analysed by the investigator. The sample comprised 1,244 GSOs that led to a shot at goal, but 376 (30.2%) set-piece (i.e., corner kicks, free kicks and penalties) shots were excluded from the analysis. Therefore, the final sample consisted of 868 GSOs for analysis.

Performance variables

Performance indicators included the type of attack (i.e., organised attack and counter-attack), initial opponent pressure (i.e., initial pressure and non-initial pressure), the number of passes (i.e., short, medium and long possession), pass length (i.e., long, short and mixed passes), the possession starting zone (i.e., defensive, middle and offensive thirds), final opponent pressure (i.e., final pressure and non-final pressure) and the type of finishing (i.e., finishing on the ground, volley and header) (Gonzalez-Rodenas et al., 2020; Kubayi, 2020; Pulling et al., 2018; Tenga et al., 2010a). The operational definitions are provided in Table 1.

Reliability assessment

The inter-operator test was conducted to determine the reliability of GSOs. Prior to data collection, a postgraduate student underwent a one-day training session on how to code the data. This session was conducted by the researcher who had more than four years of experience in match analysis at a semi-professional level. Consequently, a total of 50 GSOs were analysed independently by the researcher and a trained operator. The overall Kappa value was 0.71, which showed good strength of agreement

between the observers (Altman, 1991).

Data analysis

Descriptive statistics and chi-square of association were used to analyse the data. Furthermore, a binary logistic regression analysis was carried out to determine whether GSOs were associated with the type of attack, initial opponent pressure, the number of passes, pass length, the possession starting zone, final opponent pressure and the type of finishing. First, univariate analysis was undertaken for each independent variable separately to examine association with the dependent variable. Second, multivariate analysis was computed by including all independent variables in a single step, to assess their associations with GSOs. The level of significance was set at 0.05. All statistical analyses were conducted using the SPSS® version 26.

Results

Of the 868 GSOs, 81 (9.1%) resulted in goals. Table 2 shows descriptive statistics and chi-square of association for the studied variables. There was a significant association between GSOs and the type of attack (χ^2=6.38, p=0.01). A greater number of GSOs were created when teams adopted an organised attack (64.6%) as opposed to a counter-attack (35.4%). However, more goals were scored when teams used a counter-attack (12.7%) compared to an organised attack (7.5%). No significant (p>0.05) association was found between GSOs and initial opponent pressure. More goals were scored without initial defensive opponent pressure (10.2%) compared to when there was pressure (6.7%).

Most goals were scored following long possession (10.8%), as compared to medium (9.9%) and short (8.2%) possession. There was no significant (p>0.05) association between GSOs and pass length. A large proportion of goals were scored by means of mixed (10.7%) and short (9.1%) passes, as compared to a long pass (2.4%). Furthermore, most shots were taken when the ball possession started from the middle third of the field (62.1%), with 10% resulting in goals. More GSOs were created when there was no final pressure from the opponents, as compared to when there was pressure, with 10.4% of shots yielding goals. Finally, a header (12.5%) was the most preferred type of the body used to score goals.

Table 3 presents the result of the binary logistic regression predicting scoring a goal. In both univariate and multivariate analyses, significant associations were observed in the odds ratio between GSOs and the type of attack. However, counter-attacks recorded a higher odds ratio in univariate analysis (OR=0.56; 95%CI:0.35–0.88; p=0.01) than in multivariate analysis (OR=0.46; 95%CI:0.28–0.76; p=0.002). The multivariate analysis further indicated a significant probability of scoring when ball possession was gained from the middle third of the field (OR=0.19; 95%CI:0.44–0.88; p=0.01). No significant (p>0.05) associations were found between GSOs and other variables (i.e., initial opponent pressure, the number of passes, pass length, final opponent pressure and the type of finishing).

Discussion

The purpose of this study was to analyse GSOs at the 2019 FIFA Women's World Cup. The findings showed that 9.1% of GSOs resulted in a goal. This percentage is lower than that described by Gonzalez-Rodenas et al. (2020) who found that 15.2% of shots were converted into goals in the top four European professional domestic leagues (i.e., English Premier League, German Bundesliga, Italian Serie A and Spanish La Liga). Furthermore, the current scoring rate (9.1/1) is low compared to the previously reported ratios for conversions of shots into goals (9.8/1–12.8/1) from the past three FIFA World Cup tournaments for men (Gonzalez-Rodenas et al., 2020). While it was not within the scope of this investigation to compare GSOs between men's and women's competitions, the discrepancy in the scoring rate could be attributed to the fact that shots from set-pieces were excluded in the current study. It should be acknowledged that a greater frequency of shot-at-goal outcomes in women's soccer is mainly created from corner kicks (Mara et al., 2012).

Table 1

Operational definitions of the key performance variables on goal scoring (Gonzalez-Rodenas et al., 2020; Kubayi, 2020; Pulling et al., 2018; Tenga et al., 2010a).

Variable	Operational definition
Type of attack	
Organised attack	Starts by winning the ball in play and progresses either (a) without utilising or attempting to utilise a degree of imbalance, or (b) by creating or attempting to create a degree of imbalance by using late (third or later, evaluated qualitatively) penetrative pass or dribble. Not utilising a degree of imbalance means seeking penetration in such a way that a defending team manages to regain a high degree of balance before the end of team possession. Elaborate attacks often progress relatively slowly.
Counter-attack	Starts by winning the ball in play and progresses by either (a) utilising or attempting to utilise a degree of imbalance from start to the end, or (b) creating or attempting to create a degree of imbalance from start to the end by using early (i.e. first or second, evaluated qualitatively) penetrative pass or dribble. Utilising a degree of imbalance means seeking penetration in such a way that a defending team fails to regain a high degree of balance from start to the end of team possession.
Initial opponent pressure	
Initial pressure	One or several opponent players pressure the attackers within the first 3 s of the possession and are always located within 1.5 m of the first attackers.
Non-initial pressure	None of the players pressures the attackers during the first 3 s of the possession.
Number of passes	
Short possession	Two or less passes per team possession.
Medium possession	Three or four passes per team possession.
Long possession	Five or more passes per team possession.
Pass length	
Long pass	Long passes of 30 m or more estimated distance.
Short pass	Shorter estimated distances for short passes.
Mixed pass	Combination of long and short passes.
Possession starting zone	
Defensive third	The third of the playing field estimated from own goal line to the middle third of the field.
Middle third	The third of the playing field estimated from the end of the first third to the final third of the field.
Offensive third	The third of the playing field estimated from the end of the middle third of the field to the opponent's goal line.
Final opponent pressure	
Final pressure	One or several opponent players pressure the final player during the moment of performing the shot (the defender(s) are always located within 1.5 m of the attacker).
Non-final pressure	There are not defending players that pressure the final player during the moment of shooting.
Type of finishing	
Finishing on the ground	The final player shoots while the ball is on the ground.
Volley	The final player shoots at the goal with any part of the body except for the head, while the ball is in the air.
Header	The final player shoots at the goal using the head, while the ball is in the air.
Goal effectiveness	
Goal	After a shot, the ball goes towards the net and it is not blocked by the goalkeeper or any other player.
No goal	After shooting, the outcome of the action is any other different from scoring a goal.

Table 2.

Frequencies and percentages of the variables according to the goal effectiveness.

	N(%)	No goal N(%)	Goal N(%)	X^2	Sig.
Type of attack				6.38	0.01
Organised attack	561(64.6)	519(92.5)	42(7.5)		
Counter-attack	307(35.4)	268(87.3)	39(12.7)		
Initial opponent pressure				2.19	0.14
Initial pressure	208(24)	194(93.3)	14(6.7)		
Non-initial pressure	660(76)	593(89.8)	67(10.2)		
Number of passes				0.86	0.65
Short possession	340(39.2)	312(91.8)	28(8.2)		
Medium possession	435(50.1)	392(90.1)	43(9.9)		
Long possession	93(10.7)	83(89.2)	10(10.8)		
Pass length				2.99	0.22
Long pass	41(4.7)	40(97.6)	1(2.4)		
Short pass	538(70)	489(90.9)	49(9.1)		
Mixed pass	289(33.3)	258(89.3)	31(10.7)		
Possession starting zone				4.52	0.10
Defensive third	76(8.8)	74(97.4)	2(2.6)		
Middle third	539(62.1)	484(89.8)	55(10.2)		
Offensive third	253(29.1)	229(90.5)	24(9.5)		
Final opponent pressure				2.88	0.09
Final pressure	253(29.1)	236(93.3)	17(6.7)		
Non-final pressure	615(70.9)	551(89.6)	64(10.4)		
Type of finishing				1.37	0.50
Finishing on the ground	665(76.6)	604(90.8)	61(9.2)		
Volley	115(13.2)	106(92.2)	9(7.8)		
Header	88(10.1)	77(87.5)	11(12.5)		

Table 3

Binary logistic regression predicting scoring a goal vs. no goal.

	Univariate analysis				Multivariate analysis			
	β	SE	*p*	OR(95%CI)	β	SE	*p*	OR(95%CI)
Type of attack								
Organised attack (Ref)								
Counter-attack	−0.59	0.23	0.01	0. 56(0.35;0.88)	−0.76	0.25	0.00	0.46(0.28;0.76)
Initial opponent pressure								
Initial pressure (Ref)								
Non-initial pressure	−0.45	0.31	0.14	0.64(0.35;1.16)	−0.16	0.40	0.69	0.85(0.40;1.83)
Number of passes								
Short possession (Ref)								
Medium possession	−0.30	0.39	0.45	0.75(0.35;1.60)	−0.46	0.44	0.29	0.63(0.26;1.49)
Long possession	−0.09	0.37	0.80	0.91(0.44;1.89)	−0.32	0.39	0.40	0.72(0.34;1.54)
Pass length								
Long pass (Ref)								
Short pass	−1.57	1.03	0.13	0.21(0.03;1.57)	−1.44	1.05	0.17	0.24(0.03;1.89)
Mixed pass	−0.18	0.24	0.45	0.83(0.52;1.34)	−0.26	0.29	0.39	0.77(0.43;1.38)
Possession starting zone								
Defensive third (Ref)								
Middle third	−1.35	0.75	0.07	0.26(0.06;1.12)	−1.64	0.77	0.03	0.19(0.44;0.88)
Offensive third	0.08	0.26	0.75	1.08(0.65;1.80)	−0.14	0.30	0.64	0.87(0.48;1.56)
Final opponent pressure								
Final pressure (Ref)								
Non-final pressure	−0.48	0.28	0.09	0.62(0.36;1.08)	−0.34	0.36	0.34	0.71(0.35;1.44)
Type of finishing								
Finishing on the ground (Ref)								
Volley	−0.35	0.35	0.32	0.71(0.36;1.40)	−0.37	0.40	0.35	0.69(0.31;1.52)
Header	−0.52	0.47	0.27	0.59(0.24;1.50)	−0.53	0.49	0.28	0.59(0.22;1.54)

A key finding of this study is that both univariate and multivariate analyses indicated counter-attacks as being significantly effective in creating GSOs compared to organised attacks, which supports the findings of Tenga et al. (2010b). This study substantiates Scanlan et al.'s (2020) assertion that the quicker the transition to attack, the greater the chance of scoring goals. It is worth mentioning that teams may adopt a counter-attacking style of play in an attempt to take advantage of imbalances in the opponent's defence and thus increase the chances of scoring (Tenga et al., 2010b; Tenga and Sigmundstad, 2011). This is attributed to the fact that the nature of the counter-attack strategy requires a swift transition from one end of the pitch to another, such that the opposing team fails to regain its defensive balance (Tenga and Sigmundstad, 2011). Therefore, soccer coaches of women's teams should implement training programmes which encourage a counter-attacking playing style so that they can gain an advantage over their opponents.

Another key result was a significant association between GSOs and the possession starting zone. The multivariate analysis showed that a team was likely to score when the ball possession started from the middle third of the field. This result is consistent with that found by Scanlan et al. (2020) who reported the three midfield zones and the central attacking zone as the most effective areas for gaining possession of the ball and creating an opportunity to score a goal during the 2015 FIFA Women's World Cup. Thus, soccer coaches should consider designing match training scenarios to identify the right moments to exert more pressure on the opponents in the middle third of the field to regain possession and immediately penetrate to increase the chances of scoring goals.

Most goals were scored from longer possession as opposed to shorter sequences of passing. A possible explanation for this finding could be that a high number of consecutive passes (five passes or more) may be more effective in exploiting imbalances in the opponent's defence (Tenga et al., 2010b). From a practical perspective, soccer coaches of women's teams should implement training sessions that involve long passing sequences in an attempt to penetrate the defensive line to improve GSOs. In addition, a higher number of goals were scored when there was no initial or final defensive pressure from opposition players. This result demonstrates that the role of the defensive player in applying pressure is essential, and soccer coaches should consider coaching the appropriate distances of defensive pressure in training scenarios that involve open play (Pulling et al., 2018).

The current study found that a greater number of goals were scored using short passes in contrast to long passes. A plausible reason for this finding could be that long balls are more likely to result in a loss of ball possession compared to short passes (Mara et al., 2012). Also, playing long balls to the final third of the field may not be an effective offensive tactic in women's soccer because previous research has demonstrated that women do not have the ability to continuously run onto long balls in the opponent's half as effectively as men (Mara et al., 2012; Mujika et al., 2009). From a practical standpoint, emphasis needs to be placed on keeping ball possession by means of using short passes to move the ball forward into an appropriate goal-scoring zone (Mara et al., 2012). Thus, coaches should develop training sessions which involve small-sided games, with the aim of retaining ball possession for longer periods, thereby encouraging women players to avoid playing long balls.

Conclusions

The findings of this study highlighted that most goals were scored from counter-attacks, as compared to organised attacks. Additionally, teams scored more goals from long possession sequences than from short ones. A greater number of goals were scored using short than long passes. The highest number of goals were scored with ball possession starting in the middle third of the field. More goals were scored when there was no initial or final pressure from the opponents than when there was pressure. The findings of this study may be useful for soccer coaches in improving goal-scoring abilities at women's international competitions.

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