

## **National teams in Women's Soccer World Cup from 1991 to 2015: participation, performance and competitiveness**

JÚLIA BARREIRA, CARLOS EDUARDO DA SILVA

Department of Sports Science, Faculty of Physical Education, State University of Campinas, BRAZIL

Published online: September 26, 2016

(Accepted for publication August 14 2016)

**DOI:10.7752/jpes.2016.03126**

### **Abstract:**

The first Women's Soccer World Cup was held in 1991, since then the number of participating teams in the competition is increasing as well as the number of studies about the sport. The aim of this study was to analyze national teams in Women's World Cup from 1991 to 2015 regarding their participation, performance and competitiveness. From each one of the seven editions of the tournament were collected total goals scored, participating teams and final team rankings. All the 232 played matches were analyzed and from the final score of the game were calculated goal difference between winning and losing teams. We found a significant decrease in the amount of goals scored ( $r=-0.81$ ,  $p=0.03$ ) and goal difference ( $r=-0.89$ ,  $p=0.01$ ) per game throughout the editions. National teams from North America, Europe and Asia showed the highest participation in the tournaments. Teams of USA, Norway and Germany present a high frequency of participation in quarterfinals and also showed the greatest performances throughout the years. The results presented in this study indicate an increase in competitiveness among the teams over the years which may be a consequence of technical and tactical development of women's soccer in different countries. The best performances of USA, Norway and Germany teams reflect the great support provide in these countries for women's soccer players development.

**Key words:** performance analysis, female football, support, athlete's development

### **Introduction**

The first Women's Soccer World Cup was held in 1991 in China. Since then, the number of teams participating in the competition is increasing as well as the number of studies about the sport (Datson et al., 2014). Most of the studies about women's soccer have investigated the sociological and physiological aspects of the sport and the frequent injuries suffered by the athletes. Just a few studies have investigated athletes and teams characteristics in this tournament.

Studies about Women's World Cup analyzed the perceptions of stress and coping of the athletes during the preparatory period to the 1999 finals (Holt and Hogg, 2002), compared characteristics of women's soccer matches to men's matches in 1991 (Miyamura et al., 1997) and analyzed the offensive tactics of the quarterfinalists teams in 1999 (Konstadinidou and Tsigilis, 2005).

Although analysis of international competitions, such as the World Cup and Olympic Games, provides valuable information about changes and trends among the top teams in women's soccer (Bergier et al., 2008), no study to date has examined the participation and performance of national teams throughout the editions of the championship.

Studies about national women's soccer discussed about the recognition, legitimacy and visibility of women's soccer in the United States and the Netherlands (Knoppers and Anthonissen, 2003), Canada (Ann Hall, 2003), Norway (Fasting, 2003), Sweden (Hjelm and Olofsson, 2003), South Africa (Pelak, 2010) and Brazil (Votre and Mourão, 2013). However, the identification of the national teams with highest participations and performances during World Cup editions would allow inferring which countries are giving greater support and growth opportunity to the athletes.

Performance of the teams can be analyzed through their final ranking in the championship or using performance indicators. The performance analysis is often facilitated if the performance indicators are expressed as ratios (Hughes and Barlett, 2002). In the case of FIFA Women's World Cup, the analysis of the goals per games ratio throughout all editions can give indications about the development of the national teams and the competitiveness among them over the years.

Therefore, the first aim of this study was to analyze nation teams' participation in Women's World Cup from 1991 to 2015. The second aim was to analyze, through participation in quarterfinals and ratio of goals per game, performance and competitiveness of teams throughout the editions.

**Material & methods**

*Participants and procedures*

In order to carry out this study, all the seven editions of Women's World Cup from 1991 to 2015 were analyzed. From each edition were collected the total goals scored, participating teams and final team rankings. From each championship were collected data from all played games.

In tournaments from 1991 to 2015 there were a total of 232 played games. From 1991 to 2011 the championships were composed by five phases: group stage, quarterfinals, semi-finals, play-off for third place and final. The 2015 edition also had the round of 16 phases. Games from all the phases were analyzed.

From each match were collected the participant teams and the final score of the game. From the result of each game we calculated the goal difference between the winning and losing team. Goals scored in penalty decisions were not considered in this study.

All data were collected on the official website of the Federation Internationale de Football Association. Data used in this study are public and available online.

*Statistical analysis*

All data were tabulated and arranged in Microsoft Excel worksheet and then exported to GraphPad Prism 7 (San Diego, California, USA) in which were performed all statistical analyses. Descriptive statistics were used to summarize the collected data.

From the collected data were calculated the ratio of goals per game for each edition of the championship and for each participant team.

The evolution of goals per game ratio and the difference of goals per game over the course of the tournaments were analyzed through Pearson's correlation coefficient. The significance level of 0.05 was adopted.

**Results**

Through the seven editions of Women's World Cup there were a total of 32 participant national teams which are present in Figure 1. The teams with highest participations throughout the editions were Japan, Brazil, Germany, Norway, Sweden and USA. National teams of Asia, Europe and North America presented a high frequency of participation in the tournament. However, just a few countries of Africa have participated of the championship.

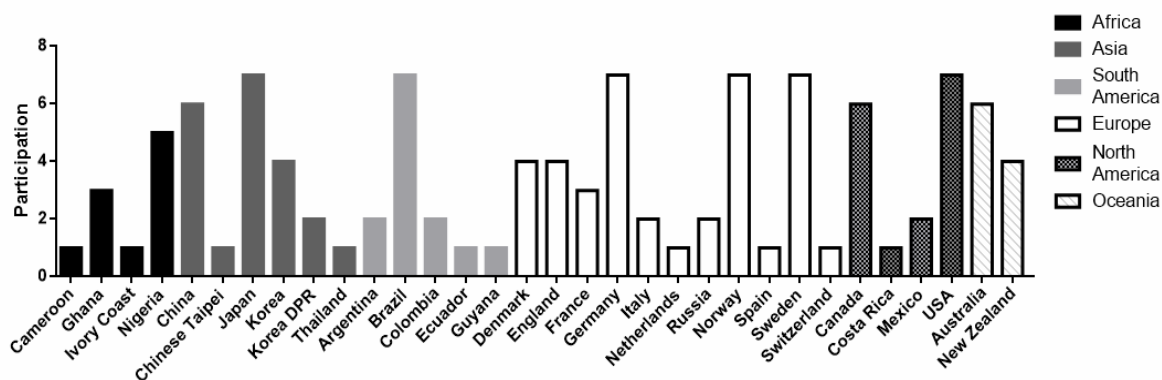


Fig. 1. Frequency of participation of national teams in Women's World Cup from 1991 to 2015.

Descriptive results of goals scored, total matches played and number of participant teams in each edition of Women's Soccer World Cup are presented in Table 1.

Table 1. Characteristics of each edition of Women's Soccer World Cup from 1991 to 2015.

	1991	1995	1999	2003	2007	2011	2015
Total goals scored	99	99	123	107	111	86	146
Total participant teams	12	12	16	16	16	16	24
Total game played	26	26	32	32	32	32	52

Over the years, there was an increase in the numbers of participant teams in the tournament, reaching 24 nations participating in the last edition (2015). On the other hand, there was a significant decrease in the amount of goals scored per game ( $r=0.81$ ,  $p=0.03$ ) and goal difference per game ( $r=-0.89$ ,  $p=0.01$ ) from 1991 to 2015 (Figure 2).

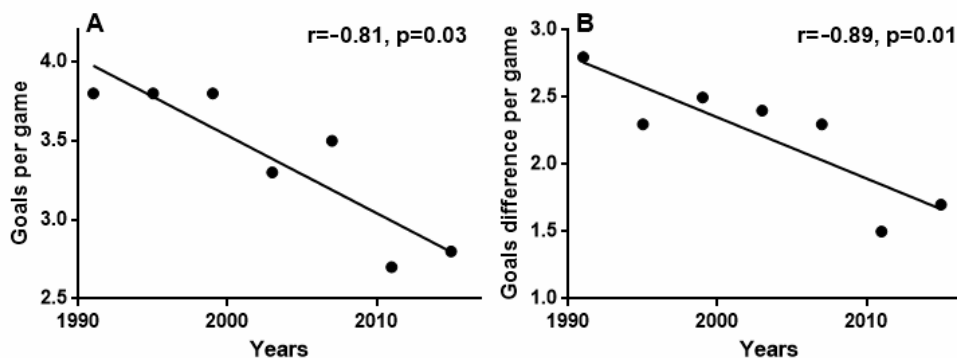


Fig. 2. Correlation between A) goals per game and B) goal difference per game over the years.

Table 2 shows the thirteen teams that participated at least once in quarterfinals. The USA participated in all quarterfinals followed by Germany with five participations and Norway with four participations. These national teams were the most frequent champions and also had the greatest ratio of goals per games.

Table 2. Characteristics of the teams which participated at least once in the quarterfinals in Women's World Cups from 1991 to 2015.

	Participations in quarterfinals	Total goals scored	Total game played	Goals per game	Champion
AUS	1 (14%)	29	22	1.32	0
BRA	2 (28%)	59	30	1.97	0
CAN	1 (14%)	28	22	1.27	0
CHN	2 (28%)	52	29	1.79	0
ENG	1 (14%)	30	19	1.58	0
DEN	1 (14%)	19	14	1.36	0
FRA	1 (14%)	22	14	1.57	0
GER	5 (71%)	111	39	2.85	2
JPN	2 (28%)	36	28	1.29	1
NIG	1 (14%)	20	23	0.87	0
NOR	4 (57%)	86	35	2.46	1
SWE	3 (43%)	59	33	1.79	0
USA	7 (100%)	111	42	2.64	3

**Discussion**

The aim of this study was to analyze the participation, performance and competitiveness of national teams in Women's Soccer World Cup from 1991 to 2015. Our results showed that national teams from North America, Europe, Asia and Oceania had the highest participation in the tournaments. The teams of USA, Norway and Germany had a high frequency of participation in quarterfinals and also presented the greatest performance throughout the years. It was found a significant increase in the competitiveness among the teams throughout the editions.

The number of participant teams in Women's Soccer World Cup doubled from the first (1991) to the last edition (2015). Simultaneous to this greater visibility of the sport, the number of practitioners has increased significantly in the last two decades, becoming one of the most popular female sports (Haugen et al., 2012; Haugen et al., 2014). According to FIFA Women's Football Survey (2014), there are 30 million participants recorded in 2014, an increase of 38% from 2000, and 4.8 million female players registered in soccer associations.

National teams of Asia, Europe, North America and Oceania presented a high frequency of participation in the tournament. These results are in accordance with data presented by FIFA Women's Football Survey (2014) that 53% of the world female soccer players are associated to USA and Canada confederations, 21% to Asian Football Confederation (AFC) and 20% to Union of European Football Associations (UEFA). These confederations have also the highest sponsor and government investments in women's soccer (FIFA, 2014). Sport participation and investments may be related to international teams' success.

On the contrary of the confederations cited above, just a few countries of Africa have participated of the championship. The national teams with higher participation were Nigeria and Ghana. According to Saavedra (2006), there are plenty women's professional teams in Africa, but they have not yet been threat internationally. The cultural barriers, economic troubles and lack of resources are the most serious limitation faced by the

athletes. As our finds, Saavedra (2006) found that Nigeria, followed by South Africa and Ghana, are the most successful countries in this sport. According to the author, Nigeria's success is related to the large population of the country, to the northern states in which women have the opportunity to play and to the existence of commercial sponsorship of women's soccer.

In our study it was also analyzed the competitiveness among national teams in Women's World Cup editions through goals per game ratio. The longitudinal characteristics of goal scoring in men's World Cup have already been studied. Hughes and Frank (2005) analyzed the relationship between passes sequences and goal scoring in the 1990 and 1994 editions, Castellano et al. (2012) investigated the goals scored by winning, drawing and losing teams in the 2002, 2006 and 2010 World Cups, Leite (2013) analyzed in which periods of the games goals happened in all the championships from 1930 to 2010 and Armatas et al. (2007) also investigated time when goals were scored in three championships. Our study was the first to analyze the longitudinal performance, through goals per game ratio, of female national teams in Women's World Cup.

A decrease in goals scored and goal difference per game throughout the editions was found in the current study. It probably indicates a greater competitiveness among the teams. Possibly, over the years, the training has enabled the development of the national teams, decreasing the physical, technical and tactical discrepancy among them and allowing an approximation of their performance. Haugen et al. (2012) analyzed sprint and countermovement jump performance among female competitive soccer players from periods of 1995-1999, 2000-2005 and 2006-2010. The authors found a moderate, but positive, development in 20m sprinting velocity over time, indicating the best physical fitness of the actual women's soccer players. Besides that, possibly, the increasing number of studies about the sport may have provided valuable information and major support for training program and athletes' development.

In men's soccer it was also found a decrease in goals per game and goal difference throughout the World Cup editions. Leite (2013) analyzed the incidence of goals in 19 Soccer World Cups, from 1930 to 2010. Although the author has not discussed about the average of goals per game throughout the editions, he showed that in the first editions (1930 to 1954) there was an average of 4.4 goals per game which decreased to 2.5 in the last tournaments (1994 to 2010). Milanovic (2005) also analyzed 14 men's World Cups from 1950 to 2002 and showed a decrease in goal difference throughout the editions.

Our study investigated the national teams with major successes and greater ratio of goals per games over the editions. The results showed the hegemony of the USA participating in all the quarterfinals of the seven editions, being the champion in three tournaments with higher ratio of goals per game. This national team also showed the best ratio of goals per game in 2012 Olympic Games (Barreira, 2016). These results reflect an exponential increase in female youth, high school and college soccer teams throughout the United States in the last 30 years (Vicent and Glamser, 2006; Longman, 2001). Whereas women's soccer was played at 2.8% of colleges and universities in 70's decade, in 2000 approximately 90% of the institutions had a women's soccer team (Acosta and Carpenter, 2002).

In addition, this American hegemony may be a consequence of a long time and successful process of athlete formation and from the establishment of a professional women's soccer league. According to Vicent and Glamser (2006), "many of the US women's senior national players are products of this system, and they have dominated women's international soccer competitions in the last decade".

Besides USA, Germany and Norway teams had greater performances and ratio of goals scored per match throughout the editions. Scatron et al. (1999) investigated national similarities and differences with respect to how women enter the world of soccer in England, Germany, Norway and Spain. The authors found that "the development of a well-organized youth policy for girls and young women would seem to be crucial in increasing female participation rates". Such policies are better established in Germany and Norway, with the benefits highlighted by the female players in relation to their early opportunities to participate.

Therefore, gender equality, women's empowerment, the establishment of a professional league, youth development, tournaments promotions and participation opportunities seem to be fundamental to the success of national teams (Matheson and Congdon-Hohman, 2011; Cho, 2013; Jacobs, 2014).

## Conclusions

The results presented in this study are advancing with knowledge about women's soccer. This study has analyzed the participation, performance and competitiveness of national teams throughout Women's World Cup editions. The results showed that national teams from North America, Europe, Asia and Oceania had the highest participation in the tournaments. Teams of USA, Norway and Germany showed a high frequency of participation in quarterfinals and also presented the greatest performance over the years. It was found a significant increase in the competitiveness among the teams throughout the editions.

## References

- Acosta, R.V., Carpenter, L.J. (2002). Women in intercollegiate sport: A longitudinal study— Twenty five-year update, 1977–2002. Brooklyn, NY: Brooklyn College, Department of Physical Education.
- Ann Hall, M. (2003). The game of choice: Girls' and women's soccer in Canada. *Soccer and Society*, 4(2-3), pp. 30-46.

- Armatas, V., Yiannakos, A., Sileloglou, P. (2007). Relationship between time and goal scoring in soccer games: Analysis of three World Cups. *International Journal of Performance Analysis in Sport*, 7(2), pp. 48-58.
- Barreira, J. (2016). Age of Peak Performance of Elite Women's Soccer Players. *International Journal of Sports Science*, 6(3), pp. 121-124.
- Castellano, J., Casamichana, D., Lago, C. (2012). The Use of Match Statistics that Discriminate Between Successful and Unsuccessful Soccer Teams. *Journal of Human Kinetics*, 31, 139-147.
- Cho, Seo-Young. (2013). A league of their own: Female soccer, male legacy and women's empowerment Berlin: DIW Berlin
- Datson, N., Hulton, A., Andersson, H., Lewis, T., Weston, M., Drust, B., Gregson, W. (2014). Applied physiology of female soccer: an update. *Sports Medicine*, 44(9), pp. 1225-1240.
- Fasting, K. (2003). Small country-big results: Women's football in Norway. *Soccer and Society*, 4(2-3), pp. 149-161.
- Fédération Internationale de Football Association Women's Football Survey 2014. (2014). Switzerland: Zurich.
- Haugen, T.A., Tennessen, E., Seiler, S. (2012). Speed and countermovement-jump characteristics of elite female soccer players, 1995-2010. *Age*, 7, pp. 340-349.
- Haugen, T.A., Tønnessen, E., Hem, E., Leirstein, S., Seiler, S. (2014). VO2max characteristics of elite female soccer players, 1989-2007. *International Journal of Sports Physiology and Performance*, 9(3), pp. 515-21.
- Hjelm, J., Olofsson, E. (2003). A breakthrough: Women's football in Sweden. *Soccer and Society*, 4(2-3), pp. 182-204.
- Holt, N.L., Hogg, J.M. (2002). Perceptions of stress and coping during preparations for the 1999 women's soccer world cup finals. *Sport Psychologist*, 16(3), pp. 251-271.
- Hughes, M.D., Bartlett, R.M. (2002). The use of performance indicators in performance analysis. *Journal of Sports Sciences*, 20(10), pp. 739-754.
- Hughes, M., Franks, I. (2005). Analysis of passing sequences, shots and goals in soccer. *Journal of Sports Sciences*, 23(5), pp. 509-514.
- Knoppers, A., Anthonissen, A. (2003). Women's soccer in the United States and the Netherlands: Differences and Similarities in Regimes of Inequalities. *Sociology of Sport Journal*, 20, pp. 351-370.
- Konstadinidou, X., Tsigilis, N. (2005). Offensive playing profiles of football teams from the 1999 Women's World Cup Finals. *International Journal of Performance Analysis in Sport*, 5(1), pp. 61-71.
- Jacobs, J.C. (2014). Programme-level determinants of women's international football performance. *European Sport Management Quarterly*, 14(5), pp. 521-537.
- Leite, S.S.W. (2013). Analysis of goals in soccer World Cups and the determination of the critical phase of the game. *Facta universitatis-series: Physical Education and Sport*, 11(3), pp. 247-253.
- Longman, J. (2001). The girls of summer: The U.S. women's soccer team and how it changed the world. New York: Harper Collins.
- Matheson, V.A., Congdon-Hohman, J. (2011). International women's soccer and gender inequality: Revisited. College of the Holy Cross, Department of Economics Faculty Research Series, Paper (11-07).
- Milanovic, B. (2005). Globalization and goals: does soccer show the way?. *Review of International Political Economy*, 12(5), pp. 829-850.
- Miyamura, S., Susuma, S., Hisauki, K. (1997). A time analysis of men's and women's soccer. *Science and Football III*, pp. 251-257.
- Pelak, C.F. (2010). Women and gender in South African soccer: A brief history. *Soccer and Society*, 11(1-2), pp. 63-78.
- Saavedra, M. (2003). Football feminine-development of the African game: Senegal, Nigeria and South Africa. *Soccer and Society*, 4(2-3), pp. 225-253.
- Vincent, J., Glamser FD. (2006). Gender differences in the relative age effect among US Olympic Development Program youth soccer players. *Journal of Sports Sciences*, 24(4), pp. 405-413.
- Votre, S., Mourão L. (2003) Women's football in Brazil: Progress and problems. *Soccer and Society*, 4(2-3), pp. 254-267.