Original Article

Talent map of female soccer: How does the birthplace and birthdate impact the participation of soccer players in Brazilian Serie A1 Championship?

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ABSTRACT

This present study aimed to verify the impact of birthplace and birthdate on the identification and development of talented Brazilian female players. The sample comprised 876 players from the Brazilian Serie A1 Championship between 2003 and 2020. Players' birthdate and birthplace data from their hometowns were collected. The birthplace's variables used were city size and Human Development Index (HDI). Descriptive statistics, chi-square, and Pearson correlation tests were performed. Results indicated that the players who were born in small cities (up to 100,000 inhabitants) and large urban centres (> 6,000,000 inhabitants), also with high HDI (> 0.701), have a greater chance to play in the most important tournament of the country. Results did not indicate significant differences in the frequencies of players born in each quartile according to players' positional roles. Based on these findings, it is possible to conclude that the environmental conditions of birthplace are essential to promote initial conditions for the training processes related to soccer. They bring a relevant contribution to facilitate the pathway to high-level performance.
Keywords: Talent identification, Female football, Human Development Index, City size, Relative age effect.

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INTRODUCTION

Talent identification and development are both processes that have been investigated in soccer for several decades (Sarmento et al., 2018; Williams & Reilly, 2000). Talent identification involves recognizing players participating in the sport who have the potential to progress into a high-development programme (Williams et al., 2020). In turn, talent development consists of a relatively systematic combination of coaching, support, training, and match-play designed to improve players (Williams et al., 2020).

The literature has pointed out that both processes are directly affected by different individual and environmental variables (Burgess & Naughton, 2010; Johnston et al., 2018; Teoldo et al., 2013; Teoldo & Cardoso, 2021). The environmental variables could be those related to the player's birthplace, as the city size (also known as community size or population size), and the Human Development Index (HDI) (Côté et al., 2006; Teoldo et al., 2013; Teoldo & Cardoso, 2021). The city size refers to the number of people living in the city. At the same time, the HDI is a compilation of data intended to reflect the health, education, and income of the population of that location, using the most recent data available (Asher & Daponte, 2010). The importance of this variable concerns the quantity and quality of opportunities that these young people could or could not have access to, depending on the context in which they are inserted (Côté et al., 2006; Teoldo & Cardoso, 2021). Regarding individual variables, the birthdate has been classified as an aspect of significant influence (Sierra-Díaz et al., 2017; Teoldo et al., 2013; Teoldo & Cardoso, 2021).

Both aspects (birthplace and birthdate) demand attention due to their nature: they cannot be controlled by the clubs/academies and cannot be changed by the training processes (Côté et al., 2006; Teoldo et al., 2013; Teoldo & Cardoso, 2021). In this respect, the club generally intervenes only in the identification of a prospect, who is latterly nurtured until achieving his/her full potential (Baker et al., 2018; Teoldo et al., 2013). Therefore, by focusing its efforts on the available scientific evidence about the characteristics of the social environment in which players are born and raised, clubs can optimize and expand their approaches for detecting and enhancing the development of young talents (Larkin & Reeves, 2018; Sieghartsleitner et al., 2019).

In this regard, the birthplace influences long-term expertise and the chance to reach elite levels of professional sport (Côté et al., 2006; Larkin & Reeves, 2018; Teoldo & Cardoso, 2021). The literature generally points out that smaller cities facilitate sport participation and performance in large countries such as Canada, the United States of America and Australia (Hancock et al., 2018). In addition, smaller cities provide a suitable environment for talent development in the early years, which includes easy access to spaces supporting unlimited and variable play/practice opportunities, early exposure to sports activities, competitions with older peers or adults and broad cross sport experiences (Baker et al., 2009; Côté et al., 2006; Turnnidge et al., 2014).

In addition, the HDI can be used as complementary information to the city size, providing richer and more accurate information about the players' birthplace (Teoldo et al., 2013; Teoldo & Cardoso, 2021). For example, a study conducted by Teoldo & Cardoso (2021) shows that players born in cities with city sizes up to 100,000 inhabitants and HDI above 0.501 were more likely to play at the highest level of Brazilian male soccer. Additionally, this study identified regions with a higher probability of finding specific positional roles' players. This fact can be beneficial for clubs in searching for potential talents for specific positions since it is widely known that players of different positions have different characteristics in several behaviours of the game (Di Salvo et al., 2007; Machado et al., 2019; Teoldo et al., 2013).

In turn, the birthdate can influence the more significant presence of athletes born at the beginning of the competitive year and the underrepresentation of those born at the end of that year (Delorme et al., 2010). This phenomenon is known as the relative age effect (RAE) and has several possible explanations reported in the literature (Hancock et al., 2013; Wattie et al., 2015). The RAE is reported in studies as an advantage in favour of the chronologically older. It could be related to physical and anthropometric development (Helsen et al., 2000; Helsen et al., 2005), in addition to a longer practice time due to the age difference (Burgess & Naughton, 2010). These factors can lead to severe errors in talent identification and development processes since they mainly focus on the athletes' physical, physiological, and anthropometric indicators (Johnston et al., 2018). Consequently, it neglects other variables that are incredibly relevant to the soccer game, such as cognitive and tactical indicators (Helsen et al., 1998; Sierra-Díaz et al., 2017).

Despite the importance of these variables for the talent identification and development processes, few researchers studied them in an integrative form inside the female context. A systematic review conducted by Johnston and colleagues (2018) reported that only 35% of the works about these processes in sport used women in their sample. In the specific context of soccer, this representation is even lower: 7% (2 of 27), according to Williams and colleagues (2020). Both studies found that there is a focus on the analysis of motor characteristics for talent prediction (Höner et al., 2019; Leyhr et al., 2019).

Separately, the birthplace effect in female soccer was analysed by Macdonald and colleagues (2009), with the results pointing to the over-representation of players born in smaller cities (up to 1,000,000 inhabitants) in the United States of America. Regarding HDI, no studies were found. Furthermore, the birthdate effect in female soccer, represented by the RAE, has inconsistent results in the literature (Sierra-Díaz et al., 2017). A good number of studies reported the existence of this phenomenon in different age groups and countries (Delorme et al., 2010; Götze & Hoppe, 2021; Li et al., 2020; Romann & Fuchslocher, 2011; Sedano et al., 2015). However, some studies reported no RAE in the sample (Da Silva et al., 2015), and even RAE varied according to geographical location (Romann & Fuchslocher, 2013). When we consider the positional roles, several studies report the prominence of the RAE for some positions, particularly goalkeepers and defenders (Li et al., 2020; Romann & Fuchslocher, 2013; Sedano et al., 2015).

Even with the insufficient investigation focusing on female talent identification, there are good predictions for the future: an editorial by Williams (2020) reports the growth of research in this area and a more significant effort by the researchers to use new experimental designs. In this sense, this article brings an innovative design to bring relevant information regarding the influence of individual (birthdate) and environmental factors (birthplace – city size and HDI) to female talent identification. Furthermore, contributing to the government, federations, and clubs, guiding these entities in making more assertive decisions about investments in female sport development and also in identifying talent where it arises. Thus, the present study aims to verify the impact of birthplace and birthdate on the identification and development of talented Brazilian female players.

MATERIALS AND METHODS

Sample

4,838 data points were collected from players enrolled in the Brazilian Serie A1 Championship between 2003 and 2020. From this total, 2,041 data were excluded due to lack of information on the birthplace or the birthdate, 76 data referring to the number of athletes born outside Brazil, and 1,845 duplicate data, which means when the athlete participated in more than one edition of the championship. The final sample consisted of 876 players (87 goalkeepers, 274 defenders, 307 midfielders, and 208 forwards). The players

had an average age of 25.85 ± 5.71 years. The players' birthplaces observed that the average population was 2,531,121 ± 3,838,411 inhabitants, with an average HDI value of 0.74 ± 0.08.

As inclusion criteria used was the players should be registered for at least one season and included in at least one Brazilian Serie A1 Championship match between 2003 and 2020. For players who participated in more than one season of the competition, only the first season in which they met the above criteria was taken into account to avoid data duplication.

Data collection procedures

The players' birthplaces and birthdates were collected through the websites: OGOL (https://www.ogol.com.br/), from official websites of the clubs participating in the competition (when information was available), and the website of the Brazilian Football Association – *Confederação Brasileira de Futebol* - (CBF) (http://www.cbf.com.br). The data were compared by pairing between these sources to verify their veracity. Duplicate data from the players, data with divergence in the sources consulted, and data with incomplete information were excluded from the analysis.

Regarding HDI and the city size, they were collected, respectively, on the official websites of the United Nations Development Program (UNDP) (http://www.pnud.org.br) and Brazilian Institute of Statistical Geography – Instituto Brasileiro de Geografia e Estatística (IBGE) (http://www.ibge.gov.br). For the analysis of these variables, the 2000 census was considered, as it represents more excellent proximity to the birthdate of the players in this sample, following the recommendations observed in recent studies (Teoldo & Cardoso, 2021). In addition, the census in Brazil is not researched annually, making it impossible to use the census according to the specific year of birth of each athlete in the sample. For analysis purposes, the HDI data was divided into three intervals [T1 (<0.500); T2 (0.501-0.700), and T3 (> 0.701)], as suggested by Asher & Daponte (2010) and Teoldo & Cardoso (2021). This subdivision identifies some general characteristics of the population's quality of life. Cities with a high HDI have a high quality of life and fewer social problems, inequalities, and poverty. Cities with medium HDI have a reasonable standard of living, infrastructure, and an advanced level of industrialization. They are also predominantly urban. However, they still face some social problems. Finally, cities with a low HDI have severe socioeconomic problems, negatively affecting the quality of life of their population.

The city size data were organized in 17 intervals, following the proposals of Teoldo, Cardoso & Garganta (2013), and Teoldo & Cardoso (2021). This division allows a better interpretation of the results by presenting the specific characteristics of cities with different population sizes in more detail. Furthermore, the distribution of the players concerning the state of birth was also considered. For that, all 27 Brazilian states were considered.

The birthdate was divided into quartiles [Q1 (Jan-Mar); Q2 (Apr-Jun); Q3 (Jul-Sep) and Q4 (Oct-Dec)], following the date range from January 1st to December 31st applied by the Fédération Internationale de Football Association (FIFA) for all international competitions.

To provide detailed information on the impact of birthplace (i.e., city size and HDI) and birthdate, players were grouped according to their respective positional roles (Goalkeepers, Defenders, Midfielders, and Forwards). These categories allow a better analysis of the specific characteristics of the birthplace and the relative age that can be associated with the development of players who play in different positions (Di Salvo et al., 2007; Teoldo & Cardoso, 2021).

This study was conducted according to the ethical guidelines of the lead institution, the standards of the Declaration of Helsinki (2008), and the National Health Council (2012).

Statistical analysis

Descriptive analysis (frequency, percentage, average, standard deviation) was performed. The Chi-square test (χ^2) was used to verify differences between the distributions of the players by position in the 17 population intervals (city size), in the birth quartiles, and in the HDI tertiles. Pearson's correlation test was used to verify the correlations between the HDI, city size, and the players' birth quartile. The reference values for correlation were: weak (below .30); moderate (between .31 and .60); strong (.61 to .90); and very strong (above .91) (Pagano & Gauvreau, 2018). All statistical procedures adopted the level of significance ($p < .05$) and were performed using the SPSS software *(Statistical Package for Social Science)* for *Windows*®, version 24.0.

RESULTS

Cities' size

The results indicate that 36.1% of the players were from cities with up to 100 thousand inhabitants, 30.7% come from cities with a population between 100,001 thousand and 1 million inhabitants, and 33.2 % were born in cities with more than 1,000,001 inhabitants (see Table 1). It is also noteworthy that large urban centres (I-17) with more than 6,000,001, such as São Paulo and Rio de Janeiro, were responsible for 14.5% of this sample.

It was possible to infer from the results obtained that there is an inverse relationship between the odds of success to the professional level of Brazilian female soccer and the city's size. In this sense, the larger the city, the lower the chances of reaching professional soccer. For example, when comparing the players born in the interval (I-1) with the players born in the interval (I-17), there was a difference of up to 8,459 times in the chances of ascension in favour of those born in cities located in the interval (I-1). This difference implies that players born in the last population range (I-17) have a reduced chance of becoming professional compared to those from the smallest cities (I-1).

Still related to city size, it was observed that, when comparing the frequency of players from different positional roles to the detriment of the population range in which they were born, we found significant differences in 8 of the 17 population ranges [$\chi^2 = 3547{,}322$; $p < .001$] as presented in Table 1. In this comparison, smaller cities were more heterogeneous; that is, the development of some positions is more prominent than others. In this respect, it is possible to highlight cities with up to 100,000 inhabitants (I-1, I-2, I-3, and I-4). Similar data were noted in intervals I-6, I-12, I-15, and I-17. In turn, despite providing a smaller number of players, the other cities presented a greater homogeneity in the development since fewer statistical differences were observed in this interval; they did not allow a statistical categorization of which positional roles were better developed in their territories.

It is noteworthy that, among all the 27 Brazilian states, five stand out as the primary sources for the development of professional female soccer players: São Paulo (39.5%), Rio de Janeiro (9.7%), Minas Gerais (7.5%), Rio Grande do Sul (7.1%) and Bahia (5.8%). Regarding Brazilian regions, the southeast region, the country's most populated region, provides 57.8% of the sample of this study.

Cities' Human Development Indexes (HDI)

Concerning the birthplaces' HDIs, it was noted that 79.5% of the players were born in cities with HDI above 0.701 and 17.7% were from cities with HDI between 0.501 and 0.700.

Table 1. Frequency of players in each population interval, significance level, and players' odds of ascending to the professional level of Brazilian Female Soccer.

Intervals	Population of Cities		Absolute Frequency				Total Players	Relative Frequency	Intra-interval comparison		Odds of Success**	
	Minimum	Maximum	Goalkeepers	Defenders	Midfielders	Forwards			χ^2	*p*		
I-1	1787	30000	19	51	67	36	173	19.7	29.243	<.001*	10	173
I-2	30001	50000	5	24	30	15	74	8.4	19.297	<.001*	405	676
I-3	50001	100000	7	21	22	19	69	7.9	8.391	.039*	725	1449
I-4	100001	200000	5	16	23	16	60	6.8	11.067	.011*	1667	3333
I-5	200001	300000	6	7	12	9	34	3.9	2.471	.481	5882	8824
I-6	300001	400000	1	3	14	5	23	2.6	17.174	.001*	13044	17391
I-7	400001	500000	4	3	8	3	18	2.1	3.778	.286	22222	27778
I-8	500001	600000	2	7	6	4	19	2.2	3.105	.376	26316	31579
I-9	600001	700000	1	3	2	3	9	1.0	1.222	.748	66667	77778
I-10	700001	800000	1	6	6	9	22	2.5	6.000	.112	31818	36364
I-11	800001	900000	1	2	1	4	8	0.9	3.000	.392	100000	112500
I-12	900001	1000000	7	29	17	23	76	8.7	13.895	.003*	11842	13158
I-13	1000001	1500000	2	7	9	7	25	2.9	4.280	.233	40000	60000
I-14	1500001	2000000	5	6	11	7	29	3.3	2.862	.413	51724	68966
I-15	2000001	2500000	1	19	24	8	52	5.9	25.077	<.001*	38462	48077
I-16	2500001	6000000	7	16	17	18	58	6.6	5.310	.150	43103	103448
I-17	6000001	11037593	13	54	38	22	127	14.5	30.890	<.001*	47244	86910
			87	*274*	*307*	*208*	*876*	*100*				

*Note. *Significant differences found. **The odds of success were calculated by dividing the number of professional players and the minimum and maximum population within each population range.*

Table 2. Frequency of players of each positional role in the three HDI classification ranges.

Positions	HDI tertiles			Total	Intra-interval comparison	
	<0.500	Between 0.501 and 0.700	> 0.701		χ^2	*p*
Goalkeepers	2 (2.3%)	16 (18.4%)	69 (79.3%)	87 (100.0%)	86.138	<.001*
Defenders	7(2.6%)	42 (15.3%)	225 (82.1%)	274 (100.0%)	300.139	<.001*
Midfielders	8 (2.6%)	57 (18.6%)	242 (78.8%)	307 (100.0%)	297.661	<.001*
Forwards	8 (3.9%)	40 (19.2%)	160 (76.9%)	208 (100.0%)	185.231	<.001*
Total	*25 (2.9%)*	*155 (17.7%)*	*696 (79.4%)*	*876 (100.0%)*	*867.377*	*<.001**

*Note. *Significant differences found.*

On the other hand, cities with an HDI below 0.500 were not very representative, as only 2.9% of the players who play professional soccer were born in these conditions. Among the Brazilian states with the highest number of players at the professional level, the following HDIs were found: São Paulo (0.78 ± 0.34), Rio de Janeiro (0.77 ± 0.42), Minas Gerais (0.72 ± 0.71), Rio Grande do Sul (0.76 ± 0.45) and Bahia (0.64 ± 0.11).

When comparing the frequency of players of different positional roles, according to HDI tertiles, significant differences were found for all positions: Goalkeepers, Defenders, Midfielders, and Attackers (See Table 2); in all of these, we noticed an advantage in the number of players born in T3 (> 0.701).

Players' birthdate

The players' birthdates indicated that players born in the first semester represented approximately 52.5% of the players who played in the Brazilian professional championship. This result also demonstrated a certain homogeneity in the distribution of the players, regardless of the positional roles by the different quartiles of the year (see Table 3).

When comparing the frequencies of players born in each quartile according to players' positional roles, no significant differences were found in the sample. When analysing the more detailed data, we noticed only one difference in the absolute values between Q1 and Q4 in the total number of players [$\chi^2 = 4.481$; $p = .034$].

Table 3. Absolute and relative frequencies according to players' positional roles and birth quartiles.

Birth Quartiles	Goalkeepers	Defenders	Midfielders	Forwards	Total
1º Q	27 (31.0%)	72 (26.3%)	83 (27.1%)	56 (26.9%)	238 (27.2%)
2º Q	18 (20.7%)	76 (27.7%)	75 (24.4%)	53 (25.5%)	222 (25.3%)
3º Q	22 (25.3%)	67 (24.5%)	82 (26.7%)	51 (24.5%)	222 (25.3%)
4º Q	23 (23.0%)	59 (21.5%)	67 (21.8%)	48 (23.1%)	194 (22.1%)
Total	*87 (100.0%)*	*274 (100.0%)*	*307 (100.0%)*	*208 (100.0%)*	*876 (100.0%)*

Correlation between HDI, city size, and players' birthdate

Correlation tests between these three variables showed a moderate and positive correlation between the city size and the HDI of the players' birthplace (r = 0.448; *se* = 0.12; $p < .001$). However, no correlations were observed between the birthdate and the HDI (r = -0.017; *se* = 0.34; $p = .603$) nor between the birthdate and the city size (r = -0.023, *se* = 0.34; $p = .500$).

DISCUSSION AND CONCLUSIONS

This present study aimed to verify the impact of birthplace and birthdate on the identification and development of talented Brazilian female players. The results indicated that the players who were born in small cities (up to 100,000 inhabitants) and in large urban centres (> 6,000,000 inhabitants), also with high HDI (> 0.701), have a greater chance to play in the highest-level championship of Brazilian female soccer. Concerning the birthdate, the results indicated that there were no differences between players who were born in the 1st and 2nd semesters. Therefore, the birthplace impacts the identification and development of talented Brazilian female players once its characteristics affect the probability of playing in the most important tournament in the country. However, the same impact was not verified for the birthdate effect.

Regarding the birthplace, the findings of this study are similar to those of Teoldo & Cardoso (2021). The values indicated as ideal for city size and HDI were very close. This fact indicates that the conditions of

birthplace seem to be transversal for both talented male and female players in Brazil. However, it is highlighted that the socioeconomic and socio-educational conditions analysed from the HDI were even more determinant in female players. While in male soccer, moderate HDI characteristics (between 0.500 and 0.700) were already considered an ideal scenario for the development of talent, in female soccer, this happens in a context of high HDI (>0.701). This question may be related to anthropological aspects of the difficulties encountered by women in practicing sports in Brazil. Its presence is more significant in places where the quality of life is noticeably better, with better public health, education policies and equal income distribution. Given that, poverty has become a limiting element for women to practice sports due to the lack of time generated by the excessive demand for domestic work and the absence of adequate spaces (Pereira & Raiher, 2020). In terms of city size, the results of present study partially agree with the results from Macdonald and colleagues (2009), pointing that smaller cities contributes with a great numbers of elite athletes in female soccer. However, in Brazilian context, the results also indicate that the largest cities of the country have a significant impact on the participation of the soccer players in the Serie A1 Championship.

In this sense, being born in cities with up to 100,000 inhabitants and high HDI (>0.701) can result in some advantages: the informal practice of soccer in the early years (Côté et al., 2006; Teoldo et al., 2013; Teoldo & Cardoso, 2021), as well as better familiarization with the sport and the better possibility of acquiring motor skills (Côté et al., 2006). Furthermore, smaller cities with a high HDI tend to be safer, provide reasonable access to education and health, and have adequate spaces to play sports, thus allowing children to practice long periods of sport without adult supervision (Teoldo & Cardoso, 2021). In addition, better conditions of safety, health, and education (characteristics associated with the HDI) are directly associated with better cognitive development, a key factor for team sports performance (Côté et al., 2006; Côté & Hancock, 2016). Another factor concerns the contribution of the largest cities in Brazil (São Paulo and Rio de Janeiro) to female talent identification and development. In these locations, despite the less marked characteristics of talent development based on spontaneous practice, there are several possibilities for deliberate practice in more qualified training centres (Côté et al., 2006), in addition to the proximity to talent clubs (Rossing et al., 2018). Consequently, girls have contact with quality sports projects and qualified professionals from an early age and have better chances of participating in competitions that are also more qualified (Côté et al., 2006). The integration of these factors increases the chance of reaching a high-level performance.

For the birthdate, the results of the present study indicated no significant differences in the frequency of birth of female players between the quartiles of the year, regardless of positional roles. These findings are in disagreement with other studies which found the prominence of players who were born at the beginning of the year in female soccer (Delorme et al., 2010; Götze & Hoppe, 2021; Li et al., 2020; Romann & Fuchslocher, 2011; Sedano et al., 2015). However, these results support recent and relevant evidence that the higher the level of competition, the lower the presence of RAE (Brustio et al., 2018; Fleming & Fleming, 2012; Götze & Hoppe, 2021). This can be explained by the increasing importance of psychological, technical, and tactical indicators at the elite level, supplanting the possible advantages created by the physical and anthropometric variables in the youth categories (Carling, 2013; Rampinini et al., 2009; Vestberg et al., 2020). This reasoning is also valid in explaining the differences in the results of this study with others that found greater prominence of the RAE for the positions of goalkeeper and defender, attributing this fact to the physical characteristics required for such positions (Li et al., 2020; Romann & Fuchslocher, 2011; Sedano et al., 2015).

No other manuscript found in the literature has used city size, HDI and birthdate in the female soccer talent identification. The few studies dedicated to this theme in female soccer used approaches based on motor skills (Randell et al., 2021), which may be insufficient to adequately explain such a complex phenomenon. In this sense, the present study proves to be pioneering in its experimental design, aiming to understand the

possible influence and importance of the variables that provide accurate detail regarding the environment that young athletes are born in and develop in their early years. Despite that, the present study presents some limitations, such as discarding a high number of data due to the lack of information on the players' birthplace. It would be interesting for the entities that organize female soccer competitions to collect and store this data more meticulously in the future. Another limitation concerns the Brazilian census, which is not researched annually, and it can have its research methodologies and variables changed from one edition to the next. Finally, the birthplace used may not represent entirely where the player's development occurred since she may migrate from city to city during her career. Suggestions for future studies on the topic include the use of other environmental variables such as community density, first club location and proximity to talent clubs in addition to city size and HDI. Assessments concerning the practice of the players during her youth and the migration net are strongly encouraged.

Practical applications

Based on the results found in the present study, some practical applications would be of fundamental importance to improving female talent identification and development.

The first of these concerns is promoting and expanding public policies encouraging greater sports practice for women, including soccer. When comparing the present study sample with the study by Teoldo & Cardoso (2021), we notice that, even with the difference in the period, there is a much smaller number of practitioners of professional female soccer in Brazil. This fact may be associated with the low number of practitioners of the sport compared to males. The greater the adherence and the practice of a particular sport, the greater the levels of competitiveness and selectivity tend to reach a high level in this modality (Delorme & Boich, 2009). In addition, a broader and more diverse practice in the early years, with a subsequent engagement in a specific sport, is, evidently, a better alternative for developing more competent players in several aspects (Côté et al., 2020).

In addition to investments contributing to the massification of the sport, another relevant aspect would be the decentralization of competitions. According to data from the present study, the three primary states responsible for developing professional athletes in female soccer are: São Paulo (39.5%), Rio de Janeiro (9.7%), and Minas Gerais (7.5%). All of them are in the country's southeast region, and together they represented more than half of the Brazilian professional players: 56.7%. The reason for this may be related to the more significant presence of teams and competitions in the south-eastern region; therefore, promoting the creation of competitions and teams in other Brazilian regions would cause a greater decentralization of the modality and a good impact.

Finally, one more option would be the creation of training centres in cities with the characteristics considered ideal (smaller cities with high HDI) for the development of female players. These centres would allow better talent development where it effectively appears most. Furthermore, in addition, to allow children to develop better aspects of socio-emotional characteristics, they would be closer to their families and have more social security (Teoldo & Cardoso, 2021). In the long term, this fact can become primordial to improve the chances of these athletes having a more promising sports career (Côté, 1999).

AUTHOR CONTRIBUTIONS

Israel Teoldo conceived and designed the study; Victor Reis Machado gathered the data; Felippe Cardoso analysed the data; Israel Teoldo, Victor Reis Machado, Filipe Casanova, and Felippe Cardoso wrote and revised the paper and approved the final submission.

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DISCLOSURE STATEMENT

No potential conflict of interest were reported by the authors.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author, I. T., upon reasonable request.

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