Relative age effects in Colombian women's teams: 2022 Bolivarian games case

**Efectos de la edad relativa en selecciones femeninas de Colombia: caso juegos
bolivarianos 2022**

**Efeitos da idade relativa nas equipes femininas colombianas: caso dos jogos
bolivarianos 2022**

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ABSTRACT

Relative Age Effects (RAE) refer to those (dis)advantages and outcomes that stem primarily from an interaction between the date of birth and the dates used to logistically organize the participants. RAE is consistently prevalent in female sports contexts, with 25% more relatively older participants (Q1) than relatively younger participants (Q4). Our objective was to identify the RAE in the Colombian women's teams participating in the last Bolivarian Games (JB) (ODEBO, 2022). A total of n = 87 dates of birth were analyzed using the chi-square statistical test. The analysis allowed us to establish that there are no RAE in the female teams participating in JB (X^2 = 12,2; p = 0,836). These findings are important in the context of Colombian women's sports and can be considered by organizations, and sports clubs, as well as in guidelines for the identification and Selection of sports talents.
Key words: Sports, Female, Growth, Development.

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RESUMEN

Los efectos relativos de la edad (RAE) se refieren a aquellas (des)ventajas y resultados que proceden fundamentalmente de una interacción entre la fecha de nacimiento y las fechas utilizadas para organizar logísticamente a los participantes. Los RAE prevalecen constantemente en contextos deportivos femeninos, con un 25 % más de participantes relativamente mayores (Q1) que participantes relativamente más jóvenes (Q4). Nuestro objetivo fue identificar los RAE en las selecciones Colombia femeninas participantes en los últimos juegos Bolivarianos [JB] (Organización Deportiva Bolivariana [ODEBO], 2022). Se analizaron un total n = 87 fechas de nacimiento, utilizando la prueba estadística de chi-cuadrada. El análisis nos permitió establecer que no existen los RAE en las selecciones femeninas participantes en los JB (X2 = 12,2; p = 0,836). Estos hallazgos son importantes para el contexto del deporte femenino colombiano y pueden ser tenidos en cuenta por organizaciones, clubes deportivos, así como en lineamientos para la identificación y selección de talentos deportivos.

Palabras clave: Deportes, Femenino, Crecimiento, Desarrollo.

RESUMO

Os Efeitos da Idade Relativa (RAE) referem-se àquelas (des)vantagens e resultados que decorrem principalmente de uma interação entre a data de nascimento e as datas utilizadas para organizar logisticamente os participantes. O EIR é consistentemente prevalente em contextos esportivos femininos, com 25% mais participantes relativamente mais velhos (Q1) do que participantes relativamente mais jovens (Q4). Nosso objetivo foi identificar o RAE nas equipes femininas colombianas participantes dos últimos Jogos Bolivarianos (JB) (ODEBO, 2022). Um total de n = 87 datas de nascimento foram analisadas pelo teste estatístico do qui-quadrado. A análise permitiu estabelecer que não há EIR nas equipes femininas participantes do JB (X^2 = 12,2; p = 0,836). Esses achados são importantes para o contexto do esporte feminino colombiano e podem ser levados em consideração pelas organizações e clubes esportivos, bem como nas diretrizes para a identificação e seleção de talentos esportivos.

Palavras chave: Esportes, Feminino, Crescimento, Desenvolvimento.

INTRODUCTION

There is evidence from a variety of fields (e.g. sport and education) that has shown that policies of grouping pupils into specific age groups provide advantages to some and disadvantages to others (Wattie et al., 2015). Although chronological age (CA) grouping is a well-intentioned policy, age discrepancies between those born on January 1 of a respective year and those born on December 31 of the same year lead to significant differences in social evaluations (e.g. academic grades, or in talent identification processes in sport) (Cobley et al., 2009). These differences are collectively referred to as relative age effects (RAEs). In a narrative review, the underlying causes of RAEs were established as potentially multifactorial, referring specifically to a mix of physical, cognitive, emotional and social factors (Musch & Grondin, 2001). While these factors may explain these effects, explanations have been based on or associated with two interactive processes, namely maturation and selection (i.e., the "maturation-selection" hypothesis) (Smith et al., 2018). This hypothesis suggests that higher CA is accompanied by more favorable anthropometric

(e.g., height) and physical (e.g., muscle strength) characteristics, which may provide advantages in performance and, of course, in sports selection (Smith et al., 2018).

It is widely known that biological maturation in young people of the same CA varies greatly between the athletic and non-athletic population (Meylan et al., 2010). For example, significant differences have been found between early- and late-maturing athletes in muscle power, speed, body mass, height, body fat, flexibility, upper limb muscle strength, and cardiorespiratory fitness (Gouvea et al., 2016; Itoh & Hirose, 2020). As a result, early-maturing athletes have a greater chance of accessing specialized training and being selected for high-performance processes, whereas late-maturing athletes are often screened out or excluded from these development opportunities (Baker et al., 2018).

RAEs are a widely studied topic in terms of the factors that contribute to an elite athlete's career success (Silva et al., 2022). While RAEs and selection biases may be delayed in adult sports, recent evidence suggests that, in the long term, relatively older individuals, in proportion to those selected in athlete development programs, are less likely to reach elite sporting levels (Smith et al., 2018). Therefore, both the perceived advantages and disadvantages of RAEs are undesirable for athlete development.

To better understand RAEs, the year is divided into quartiles (Q). Q1 runs from January to March, Q2 from April to June, Q3 from July to September, and Q4 from October to December. Regarding this division, there is a consensus in the literature about the overrepresentation of athletes born in the Q1-Q2 quartiles of the year in several sports and in several countries (Fernandez Ortega et al., 2021). Regarding female sports, it has been established that RAEs have a small but consistent influence across different sport

disciplines (Smith et al., 2018). Findings from a systematic review with meta-analysis identified that RAEs are consistently prevalent in female sporting contexts, with 25% (21% adjusted) more relatively older participants (Q1) than relatively younger participants (Q4) (Smith et al., 2018). Taking this last approach as a hypothesis, our objective was to identify the RAE in the Colombian women's teams participating in the last Bolivarian Games [BG] (ODEBO, 2022).

METHODS

Participants

A descriptive observational study was carried out, in which the female selections of collective modalities participating in the BG (ODEBO, 2022) were analyzed. The data was taken from the official BG website (https://www.bolivarianosvalledupar.com/). A convenience sample was included, with a total number of data of n = 87.

Procedures

The variables of age category and date of birth were analyzed. After obtaining the data, the variable quarter of birth was established from the date of birth of the athletes, where the year was divided into four quarters. Thus, athletes born between January 1 and March 31 belong to the first quarter (Q1), those born between April 1 and June 30 are classified in the second quarter (Q2),

those born between July 1 and September 30 were born in the third quarter of the year (Q3) and finally those born between October 1 and December 31 belong to the fourth quarter (Q4).

Statistical analysis

Jamovi software (The Jamovi Project, 2021) was used as an analysis tool. The chi-square test was used to determine the existence of RAEs and was considered statistically significant when p < 0.05. Additionally, descriptive data of the sample (mean, standard deviation and frequencies) were expressed.

RESULTS

In Figure 1, it can be observed that births present a continuous wave throughout the months, where the greatest predominance of births occurs during the month of May with a total of 11 births, while the month with the fewest registered births is the month of March.

Figure 1

Distribution of birth months of athletes.
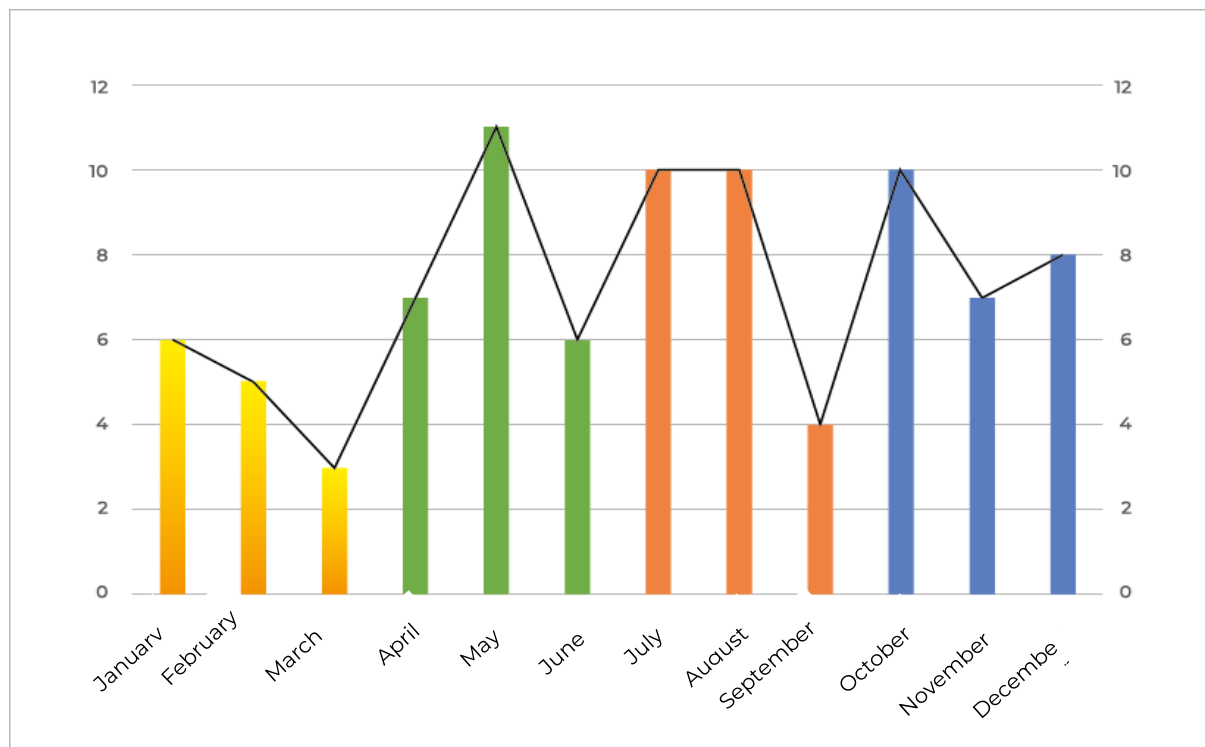
The chi-square analysis established that there are no RAEs in the female teams participating in the BG (p = 0.836). There were fewer athletes selected in Q1, while in the Q2, Q3 and Q4 quartiles there is an almost similar number of athletes selected (Table 1). On the other hand, in the analysis of data observed by sport, it was observed that in both water polo and rugby sevens, no athletes were selected in Q1 (Table 2).

Table 1

Descriptive data and the effects of relative age of the sample.

n	age	X2	gl	p	Q1	Q2	Q3	Q4
87	21,64 ± 4,88	12,2	18	0,836	14	24	24	25

Table 2

Contingency analysis for observed data and expected data by sport.

SPORT		QUARTILE				Total
		1	2	3	4	
Basketball	Observed	3	2	4	3	12
	Expected	1.93	3.31	3.31	3.45	12.00
	%	25.0%	16.7%	33.3%	25.0%	100.0%
Handball	Observed	4	3	3	4	14
	Expected	2.25	3.86	3.86	4.02	14.00
	%	28.6%	21.4%	21.4%	28.6%	100.0%
Football	Observed	3	7	5	3	18
	Expected	2.90	4.97	4.97	5.17	18.00
	%	16.7%	38.9%	27.8%	16.7%	100.0%
Artistic swimming	Observed	1	1	2	3	7
	Expected	1.13	1.93	1.93	2.01	7.00
	%	14.3%	14.3%	28.6%	42.9%	100.0%
Water polo	Observed	0	3	4	6	13
	Expected	2.09	3.59	3.59	3.74	13.00
	%	0.0%	23.1%	30.8%	46.2%	100.0%
Rugby sevens	Observed	0	5	3	4	12
	Expected	1.93	3.31	3.31	3.45	12.00
	%	0.0%	41.7%	25.0%	33.3%	100.0%
Volleyball	Observed	3	3	3	2	11
	Expected	1.77	3.03	3.03	3.16	11.00
	%	27.3%	27.3%	27.3%	18.2%	100.0%
Total	Observed	14	24	24	25	87
	Expected	14.00	24.00	24.00	25.00	87.00
	%	16.1%	27.6%	27.6%	28.7%	100.0%

DISCUSSION

Our objective was to identify RAEs in the Colombian women's teams participating in the last BG (ODEBO, 2022). It had previously been mentioned that RAEs are constantly prevalent in women's sports contexts, with 25% (21% adjusted) more of relatively older participants (Q1) than relatively younger participants (Q4) (Smith et al., 2018). However, in our findings we were able to evidence a lower participation or selection of athletes from Q1, this being a null condition in sports such as water polo and rugby sevens. Likewise, we were able to establish that there are no RAEs in the selected sample.

Our findings partially resonate with the general findings of previous literature (Smith et al., 2018), which mention that after the adolescent age (12-14, approximately in females), the magnitudes of RAEs reduce, i.e., there is a decreasing influence of growth and maturation processes on sport participation, which would

suggest an equality in terms of performance. Although males have been the predominant population studied in the literature, research suggests that sex is another significant individual constraint on the likelihood of RAEs. In general, RAEs have not been observed as consistently in female athlete populations, and the effect sizes are smaller than among males (Cobley et al., 2009). However, attempts to address this imbalance in the literature have shown that significant RAEs exist in women's football (Romann & Fuchslocher, 2011, 2013), handball (Schorer et al., 2009) and other sports (Costa et al., 2013).

An important individual limitation in RAEs is the variability between CA and biological age (Wattie et al., 2015). For example, although all youth progress through puberty to achieve full biological maturation, there are considerable differences between individuals in both the timing (i.e. onset) and pace (i.e. speed) of maturational growth, particularly during early adolescence (Malina et al., 2004). This leads to coaches and talent scouts in some cases selecting youth who are more physically mature compared to their peers. Furthermore, RAEs have allowed for an increase in the early withdrawal of late-maturing athletes and many born in the last quarters of the year. However, there is evidence that these athletes could generate higher performance in the future due to a better development of technical and tactical characteristics as a way of countering their lower physical potential (Folgar et al., 2014; Salinas, 2021).

On the other hand, we have established that a limitation of our research is the size of the selected sample. However, as suggested by Smith et al. (2018), we sought to further examine the female sports contexts where minimal samples and data are available, so we believe that our analysis raises important results for the context of Colombian and general female sports.

CONCLUSION

In general, there was no evidence of RAE in Colombian women's teams that participated in the BG. A lower participation of female athletes was observed in Q1, being null in some sports. These findings are important for the context of Colombian women's sports and can be taken into account by organizations, sports clubs, as well as in guidelines for the identification and selection of sports talents.

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