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Los efectos de la edad relativa son dominantes en los niveles menos competitivos del deporte escolar? Una investigación de estudiantes-deportistas de Minas Gerais

Are relative age effects pervasive in lower competitive tiers of school sports? An investigation of student-athletes from Minas Gerais

Os efeitos da idade relativa são pervasivos nos níveis menos competitivos do esporte escolar? Uma investigação de estudantes-atletas de Minas Gerais

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RESUMEN

Este estudio investigaba el Efecto de la Edad Relativa (EEA) en atletas escolares, según categorías y género. Han sido analizados 1356 jugadores masculinos y 1044 femeninas (de 9 a 17 años) que participaron en competencias escolares en Minas Gerais-Brasil en 2018 y/o 2019 en las categorías Sub-11, Sub-14 y/o Sub-17. Los jugadores fueron divididos en cuartos, de acuerdo con el mes de nacimiento: Q1 (enero-marzo), Q2 (abril-junio), Q3 (julio-septiembre) y Q4 (octubre-diciembre). Se realizaron pruebas de chi-cuadrado para verificar la presencia de EEA. El nivel de significación fue 5%. La distribución observada difirió de la esperada cuando todos los jugadores fueron analizados juntos ($p = 0.019$; $\omega = 0.06$), y en los hombres, cuando los jugadores fueron analizados por género ($p = 0.017$; $\omega = 0.09$). En ambos casos se encontró una mayor proporción de jugadores nacidos en los primeros meses del año ($p < 0.008$). Los resultados indicaron una distribución desigual de nacimientos en la categoría Sub-11 ($p < 0.001$; $\omega = 0.25$), en la que deportistas nacidos en Q1 y Q2 fueron más frecuentes ($p < 0.001$). Cuando se analizaron juntos categoría y género, se observó que atletas nacidos en Q1 fueron más frecuentes que los deportistas nacidos en Q3 ($p < 0.002$) y Q4 ($p < 0.001$) en la Sub-11, independientemente del género ($p < 0.002$), pero no en las categorías Sub-14 y Sub-17. Teniendo en cuenta que el deporte escolar puede ser el primer paso para alcanzar mayores niveles competitivos, es importante instruir a los entrenadores sobre el EEA, con el fin de reducir las desigualdades en el acceso al deporte escolar.
Palabras clave: Deportes de Equipo, Desarrollo de talento, Selección de talentos.

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Relative age effects on school sports

ABSTRACT

This study investigated the Relative Age Effect (RAE) in school athletes, according to sex and age categories. Birthdates from 1356 male and 1044 female athletes (aged 9 to 17 years) who played scholar competitions in Minas Gerais-Brazil in 2018 and/or 2019 in categories Under-11, Under-14 and/or Under-17 were analyzed. Athletes were divided into quarters according to their month of birth: Q1 (January-March), Q2 (April-June), Q3 (July-September), and Q4 (October-December). Chi-squared tests were performed to verify the presence of RAE. The significance level was set at 5%. The observed distribution was different from expected when all athletes were analyzed together ($p = 0.019$; $\omega = 0.06$), and in males when athletes were analyzed separately by sex ($p = 0.017$; $\omega = 0.09$). Athletes born in the three first months of the year were more frequent in both cases ($p < 0.008$). The age category analyses indicated uneven distribution of births in Under-11 category ($p < 0.001$; $\omega = 0.25$), where athletes born in Q1 and Q2 were more frequent ($p < 0.001$). When age category and sex were considered together, it was observed that athletes born in Q1 were more frequent than athletes born in Q3 ($p < 0.002$) and Q4 ($p < 0.001$) in the U-11 category regardless of sex ($p < 0.002$), but not in the Under-14 and Under-17 categories. Considering that school sport can be the first step towards achieving higher competitive levels, it is important to instruct coaches about RAE, in order to reduce inequalities in the access to school sport.

Keywords: Team Sports, Talent Development, Talent Selection.

RESUMO

Este estudo investigou o Efeito da Idade Relativa (EIR) em atletas escolares, de acordo com categorias e sexo. Analisaram-se datas de nascimento de 1356 atletas do sexo masculino e 1044 do sexo feminino (de 9 a 17 anos) que participaram de competições escolares em Minas Gerais-Brasil em 2018 e/ou 2019 nas categorias Sub-11, Sub-14 e/ou Sub-17. Os atletas foram divididos em quartis, de acordo com o mês de nascimento: Q1 (janeiro-março), Q2 (abril-junho), Q3 (julho-setembro) e Q4 (outubro-dezembro). Realizaram-se testes de chi-quadrado para verificar a presença do EIR. O nível de significância adotado foi de 5%. A distribuição observada diferiu do esperado quando todos os atletas foram analisados em conjunto ($p = 0.019$; $\omega = 0.06$), e no sexo masculino, quando os atletas foram analisados por sexo ($p = 0.017$; $\omega = 0.09$). Encontrou-se maior proporção de atletas nascidos nos primeiros meses do ano em ambos os casos ($p < 0.008$). Os resultados indicaram uma distribuição desigual de nascimentos na categoria Sub-11 ($p < 0.001$; $\omega = 0.25$), onde atletas nascidos nos Q1 e Q2 foram mais frequentes ($p < 0.001$). Quando a categoria e o sexo foram analisados conjuntamente, se observou que atletas nascidos no Q1 foram mais frequentes que atletas nascidos em Q3 ($p < 0.002$) e Q4 ($p < 0.001$) no Sub-11, independentemente do sexo ($p < 0.002$), mas não nas categorias Sub-14 e Sub-17. Considerando que o esporte escolar pode ser o primeiro passo para alcançar maiores níveis competitivos, é importante instruir os treinadores sobre o EIR, a fim de reduzir as desigualdades de oportunidades de acesso ao esporte escolar.

Palavras chave Esportes Coletivos, Desenvolvimento de Talentos, Seleção de Talentos.

INTRODUCTION

The Relative Age Effect (RAE) is a phenomenon observed in different contexts such as the academic (Oterhals et al., 2023) and sports practice (Brustio et al., 2022; Ferragut et al., 2021 Leonardi et al., 2022; Redondo et al., 2019). In both cases, advantages are observed for individuals born in the first months of the year in relation to those born in other months (Musch & Grondin, 2001). Specifically in the sports context, this occurs because athletes within the same age group may present variations in biological age, which grants them developmental advantages (Cobley et al., 2009). Thus, athletes born closer to cut-off dates may benefit from often temporary competitive advantages and tend to be perceived as more skilled by coaches.

In team sports, such as handball or volleyball, players are grouped into age categories, which comprise intervals of 2 or 3 years each, in order to provide similar conditions for competitiveness (Schorer et al., 2009). When the selection of these athletes occurs during childhood/adolescence, the difference of months in chronological age can induce coaches to choose apparently more skilled, taller and stronger athletes (Reverdito et al., 2008), even though these athletes are probably just more biologically "mature" than their relatively younger peers (Cortela et al., 2013; Edgar & O'Donoghue, 2005; Wattie et al., 2015). Accordingly, the age grouping system may contribute to the devaluation of potentially talented athletes (Cobley et al., 2009; Ferriz-Valero et al., 2020), who will have fewer opportunities for quality practice (Krahenbühl & Leonardo, 2020), and will be more likely to drop out of the sport (Delorme et al., 2011; Lemez et al., 2014). Moreover, players born in the last months of the year are at a disadvantage, as they may compete with players almost 3 years older – for example, consider an under-11 category (9, 10 and 11 years old players), with one athlete born in January 2009 and the other born in December 2011.

Studies have investigated the RAE in different modalities and contexts and found more frequent effects at higher competitive tiers (Apollaro et al., 2022; Campos et al., 2016; Cobley et al., 2009; Fonseca et al., 2019), such as Olympic sports. This is because the amount of competition for spots in teams affects the occurrence of RAE. The more athletes competing for a spot, the greater the likelihood that coaches will select relatively older athletes, as these are usually more physically developed and perceived as more skilled (Musch & Grondin, 2001). This rationale also supports why RAEs are more pervasive in male sports contexts, since males are typically more engaged in sports than females are, resulting in greater competition in tryouts and greater chances of RAE (Cobley et al., 2009; Romann et al., 2018; Smith et al., 2018).

In general, RAEs are expected to operate heavily near the beginning of puberty, where individual differences are expected to be greater (Cobley et al., 2009; Helsen et al., 1998; Smith et al., 2018). In fact, previous investigations showed that RAEs are more likely to occur in the pre-maturation period in males - after 12 years old (Cobley et al., 2009) and females - before 11 years old, probably due to biological growth differences in addition to diverse psycho-social aspects (Smith et al., 2018). Nevertheless, it should be noted that most of these studies investigated highly competitive tiers, such as professional sport and the grassroots categories at national and international levels (Cobley et al., 2009; Musch & Grondin, 2001; de la Rubia et al., 2020; Smith et al., 2018). This raises the question whether RAE would also manifest in less competitive tiers, such as regional school competitions. Despite being less competitive, which disfavor RAEs, school competitions involve a large pool of participants competing for spots in age-grouping categories, which favors the occurrence of RAEs (Cobley et al., 2009).

School sports contribute to the physical, cognitive, psychological and social development of children and adolescents (Felfe et al., 2016; Morrow et al., 2013). For this reason, it has been proposed that school competitions should focus more on providing equal practice opportunities to participants, and less on short-term performance, with the intention of benefiting more children and adolescents (Reverdito et al., 2008; Tani, 1996). Nevertheless, school sports may be the gateway to higher tires of competitiveness for many athletes. Accordingly, the coaches and sport administrators approach (with more focus on participation or in sports results) may influence the selection of athletes for school teams, favoring or not the occurrence of RAE. Hence, school sport environments with RAE pervasiveness could indicate high competition for spots and the pursuit for short-term performance, while RAE-free environments could indicate less competition for spots and greater focus on participation (Cobley et al., 2009).

In spite of the relevance of school sports, little is known about the presence of the RAE in this scenario, which may undermine the chances of relatively younger athletes reaching the higher tiers of competition (Malina, 1994). One of the few studies with this population (Cortela et al., 2013) investigated the RAE in a Brazilian school tennis competition, with participants aged 11 to 14 years old. The authors found an overrepresentation of players born in the first semester in the entire sample and in males, when participants were analyzed according to sex. On the other hand, Castro et al. (2023) investigated a sample of Brazilian student-athletes who participated in Brazilian School Games, and found that RAE was prevalent for males, from younger category (Under-14) and in team sports, but not for females, older category (Under-17) nor in individual sports. In another study, Reed et al. (2017) also found the occurrence of the RAE in English school young athletes aged 11 to 18 years old. The results of this research indicated the presence of the RAE in males in soccer, handball, basketball and cricket, but not in judo nor swimming. Additionally, RAE was observed in females in cricket, netball and rugby, but not in soccer, handball neither judo. In short, RAE investigations with the school population are scarce, and their results indicate the need to expand the understanding of this phenomenon in the school sports system.

Determining whether this RAE is present at lower competitive levels of school sport (such as regional competitions), could provide important information for school sports coaches and administrators, as it may indicate the existence of inequalities in accessing the spots in this sports system. Thus, this study aimed to verify the presence of the RAE in school competitions, according to sex and age categories. We hypothesized that higher magnitude RAEs would be found in male athletes, and that this effect would be more pervasive in the younger categories.

METHODS

Research design

An empirical, observational-type descriptive strategy (Ato et al., 2013) was used. This study has a quantitative, non-experimental, descriptive and cross-sectional design.

Participants

Birthdates of 1356 male (M = 13.23, SD ± 2.07 years) and 1044 female (M = 13.19, SD ± 1.95 years) team sports school athletes were analyzed. The athletes played basketball (125 athletes), futsal (1317 athletes), handball (602 athletes), or volleyball (356 athletes) in one or more competitions organized in 2018 and/or 2019. Inclusion criteria were being regularly enrolled in a school institution in the Metropolitan Region of Belo Horizonte (Minas Gerais), and to participate in a school team that played scholar competitions in 2018 and/or 2019. Considering the two years analyzed, 29 schools participated in the competitions.

Data Collection and Procedures

Participants' data are public information, and were obtained from Liga Mineira de Esportes (LIMES) coordination through e-mail (contato@limesmg.com.br). Information regarding the school competitions played in 2018 and 2019 was obtained from team rosters (athletes' name, school, sport modality, birth date, age, and so on). After data was obtained, we filtered information to identify and exclude repeated data entries, since the same athlete may have participated in both years analyzed in this study. Once the data was checked for repeated values, we excluded the names and schools of the athletes in the datasheet, in order to maintain the participants' anonymity. The information was then organized according to sex and age category, to investigate the existence of RAE between male and female school athletes, and to analyze its relationship with age categories.

The cut-off date for athletes participating in Brazilian school competitions are January 1st (quarters are composed as a function of this cut-off). The selected athletes' dates of birth were classified according to the quarters of birth (Q1 – January to March, Q2 – April to June, Q3 – July to September, or Q4 – October to December), sex (male or female) and age category (under-11, under-14 or under-17 athletes). Considering that each sport modality has specific age categories, according to its own regulation, in this study, the athletes were grouped by convenience into three age categories. The Under-11 (U-11) category comprised athletes from all modalities who were 9 to 11 years old; the Under-14 (U-14) category comprised athletes from all modalities who were 12 to 14 years old; and the Under-17 (U-17) category comprised athletes from all modalities who were 15 to 17 years old. Players that participated in more than one edition of the championships were considered only once, in the higher category achieved, for all analyses.

All data used in this study was publicly available and adjusted to ensure anonymity, therefore no informed consent was requested. All procedures in this study complied with the ethical standards in sport and exercise science research (Harris et al., 2019) and with the declaration of Helsinki.

Statistical analysis

Data was presented in absolute frequency. Chi-square tests ($\chi2$) were performed to compare the birthdate distribution of athletes according to sex and age categories. Considering the number of births in each quarter based on Brazilian reports from 2001 to 2010 (Brazilian Ministry of Health), the prevalence of expected observations in each quarter were: Q1 = 26.02% and 25.87% for male and female athletes, respectively, Q2 = 26.14% and 26.36% for male and female athletes, respectively, Q3 = 24.58% for male and female athletes, respectively and Q4 = 23.26% for both male and female athletes. For all analyses, the effect size (ω) of the Chi-square tests was calculated according to Cobley et al. (2009). According to the classification of Cohen (1992) 0.1 was considered a small effect, 0.3 a medium effect and 0.5 a large effect. Odds ratio (ORs) and 95% confidence intervals were calculated for both quarter and half year's distribution. The analysis was performed using the Statistical Package for the Social Sciences (SPSS) 21.0 version (Chicago, USA). Statistical significance was set at 5%. When necessary, Bonferroni adjustment for multi-comparison was performed to identify specific frequency distribution differences ($p < 0.008$).

RESULTS

Table 1 shows the absolute distribution in quarters of the date of birth of male and female school athletes, separately and grouped. The observed distribution was different from expected in the overall ($p = 0.019$; $\omega = 0.06$) and in the male athletes analysis ($p = 0.017$; $\omega = 0.09$). Athletes born in Q1 and Q2 were more frequent than athletes born in Q3 ($p < 0.008$) and Q4 ($p < 0.008$) were. On the other hand, the distribution of date of birth of the female school athletes was not different from expected ($p = 0.642$; $\omega = 0.04$).

Table 1. Relative age effects for school athletes by sex.

	Overall		Males		Females	
Quarter of date of birth	Observed	Expected	Observed	Expected	Observed	Expected
Q1	672 ^{c,d}	622.7	385 ^{c,d}	352.8	287	270.1
Q2	655 ^{c,d}	630	380	354.5	275	275.2
Q3	560	589.1	310	333.3	250	255.9
Q4	513	558.2	281	315.3	232	242.8
χ^2	9.99		10.1		1.6	
p value	0.019		0.017		0.642	
ω	0.06		0.09		0.04	
OR (Q1:Q4)	1.43		1.51		1.32	
IC95%	(1.25 to 1.63)		(1.27 to 1.81)		(1.09 to 1.62)	
OR (1st:2st)	1.53		1.68		1.36	
IC95%	(1.36 to 1.71)		(1.43 to 1.95)		(1.14 to 1.61)	

Note: Q1-Q4 = birth quarter; χ^2 = chi-square value; *p*, level of significance; *ω* = effect size; OR = odds ratio; Q1:Q4 = first quarter compared to fourth quarter; 1st:2st = first semester compared to second semester. c and d = pairwise Chi-square comparison different from Q3 and Q4, respectively (adjusted for multiple comparison).
Source: Authors

Table 2 shows the absolute distribution in quarters of the date of birth of school athletes according to U-11, U-14 and U-17 age categories. The observed distributions were different from expected in U-11 category ($p < 0.001$; $\omega = 0.25$), wherein athletes born in Q1 were more frequent than athletes born in Q3 ($p < 0.001$) and Q4 ($p < 0.001$) were, and athletes born in Q2 were more frequent than athletes born in Q4 ($p < 0.001$) were. On the other hand, date of birth distributions were not different from expected in U-14 ($p = 0.652$; $\omega = 0.04$) and U-17 ($p = 0.903$; $\omega = 0.03$) categories. Moreover, ORs for quarters of birth indicated that athletes born in Q1 were 2.76 times more likely to participate in U-11 teams, while this ratio decreased for U-14 (OR = 1.14) and U-17 (OR = 1.25). When quarters were pooled by semester (Q1 + Q2 vs. Q3 + Q4) a similar trend was observed (ORs = 2.92 vs. 1.31, and 1.2 for U-11, U-14 and U-17, respectively). Figure 1 provides an overview of the results based on sex and age categories, separately.

Table 2. Relative age effects for school athletes by age category.

	Under-11		Under-14		Under-17	
Quarter of date of birth	Observed	Expected	Observed	Expected	Observed	Expected
Q1	193 [c,d]	142.7	305	308.8	174	171.2
Q2	154 [d]	144.4	330	312.4	171	173.3
Q3	113	135	279	292.1	168	162
Q4	90	127.9	276	276.8	147	153.5
χ^2	33.2		1.6		0.6	
p value	0.001		0.652		0.903	
ω	0.25		0.04		0.03	
OR (Q1:Q4)	2.76		1.14		1.25	
IC95%	(2.07 to 3.68)		(0.95 to 1.38)		(0.97 to 1.61)	
OR (1^{st}:2^{st})	2.92		1.31		1.2	
IC95%	(2.29 to 3.73)		(1.11 to 1.54)		(0.97 to 1.49)	

Note: Q1-Q4 = birth quarter; χ^2 = chi-square value; *p*, level of significance; ω = effect size; OR = odds ratio; Q1:Q4 = first quarter compared to fourth quarter; 1^{st}:2^{st} = first semester compared to second semester. c and d = pairwise Chi-square comparison different from Q3 and Q4, respectively (adjusted for multiple comparison).
Source: Authors

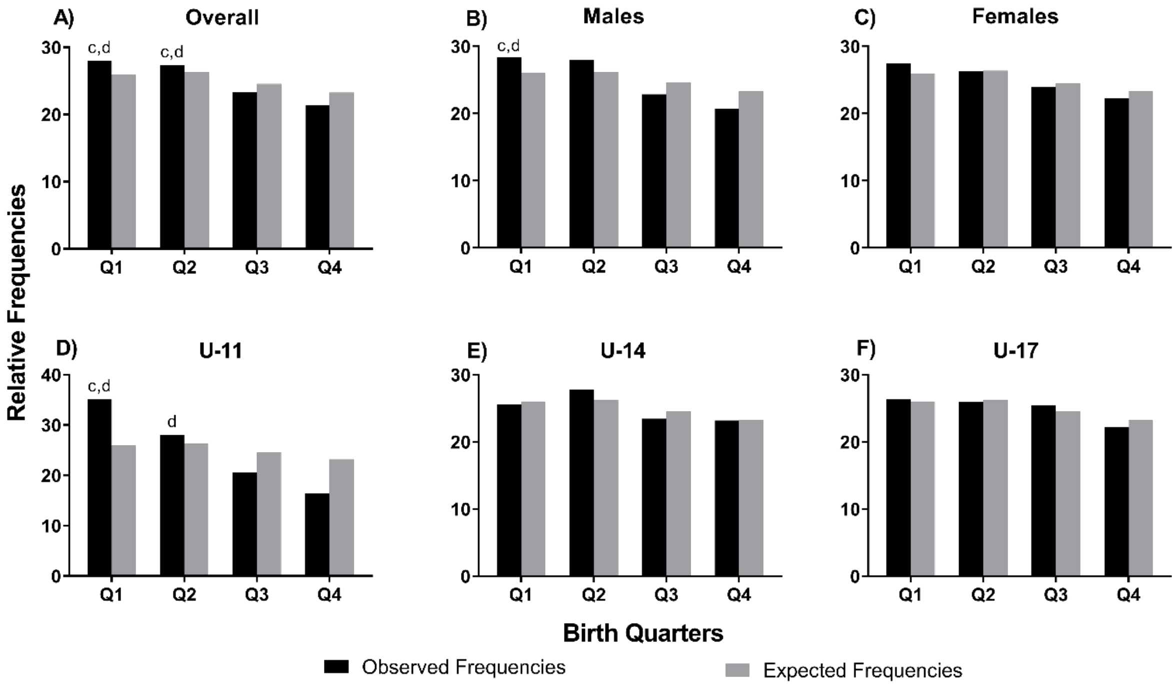

Figure 1. Relative distribution of the quarters of birth for (A) Overall sample, (B) Males, (C) Females, (D) U-11, (E) U-14, and (F) U-17.
Note: c = different from Q3; d = different from Q4; Q1;Q4 = birth quarters of the year.

Table 3 shows the absolute distribution in quarters of the date of birth of school athletes according to age categories and sex. The observed distributions were different from expected for male (p < 0.001) and female athletes (p < 0.002) in the U-11 category. In the case of males, athletes born in Q1 were more frequent than athletes born in Q3 (p < 0.001) and Q4 (p < 0.001) were, and athletes born in Q2 were more frequent than athletes born in Q4 (p < 0.002) were. In the case of females, athletes born in Q1 were more frequent than athletes born in Q3 (p < 0.002) and Q4 (p < 0.001) were. Even though small to moderate effects were found in this category analyses (ω = 0.24 and 0.26 for males and females, respectively), Odds Ratios indicated that athletes born in the first semester were almost 3 times more likely to be selected for school teams than athletes born in the second semester. On the other hand, even distributions were found for male and female athletes in the U-14 and U-17 categories (p > 0.50). Figure 2 provides an overview of the results based on the joint sex and age category analyses.

Table 3. Relative age effects for school athletes by sex and age category.

Sex	Categ	Q1	Q2	Q3	Q4	$\chi 2$	*p*	*ω*	OR - Q1:Q4	OR - 1st:2nd
		(Exp)	(Exp)	(Exp)	(Exp)				95% IC	95% IC
M	U-11	$113^{c,d}$	96^{d}	70	52	19.112	<0.001	0.24	2.78	2.93
		(86.1)	(86.5)	(81.4)	(77)				1.91 to 4.03	2.14 to 4.02
	U-14	166	176	142	138	2.289	0.51	0.06	1.71	1.08
		(161.8)	(162.6)	(152.9)	(144.7)				1.31 to 2.23	0.86 to 1.37
	U-17	106	108	98	90	0.236	0.97	0.02	1.24	1.30
		(104.6)	(105.1)	(98.8)	(93.5)				0.90 to 1.71	0.98 to 1.71
F	U-11	$80^{c,d}$	58	43	38	15.028	<0.002	0.26	2.74	2.9
		(55.7)	(57.7)	(53.7)	(50.9)				1.75 to 4.27	1.97 to 4.28
	U-14	139	154	137	138	0.853	0.84	0.04	1.01	1.14
		(147)	(149.7)	(139.2)	(132.1)				0.77 to 1.32	0.9 to 1.43
	U-17	68	63	70	57	1.262	0.74	0.07	1.26	1.06
		(66.7)	(68)	(63.3)	(60)				0.84 to 1.89	0.75 to 1.5

Note: Categ, Age categories; Q1-Q4, birth quarter; (Exp), expected distribution; *χ2*, chi square; *p*, level of significance; *ω*, effect size; OR - Q1:Q4, odds ratio from Q1 to Q4; OR - 1st:2nd odds ratio from 1st semester to 2nd semester; M, male athletes; F, female athletes; U-11, Under 11; U-14, Under 14; U-17. Under 17; c, different from Q3; d, different from Q4.
Source: Authors

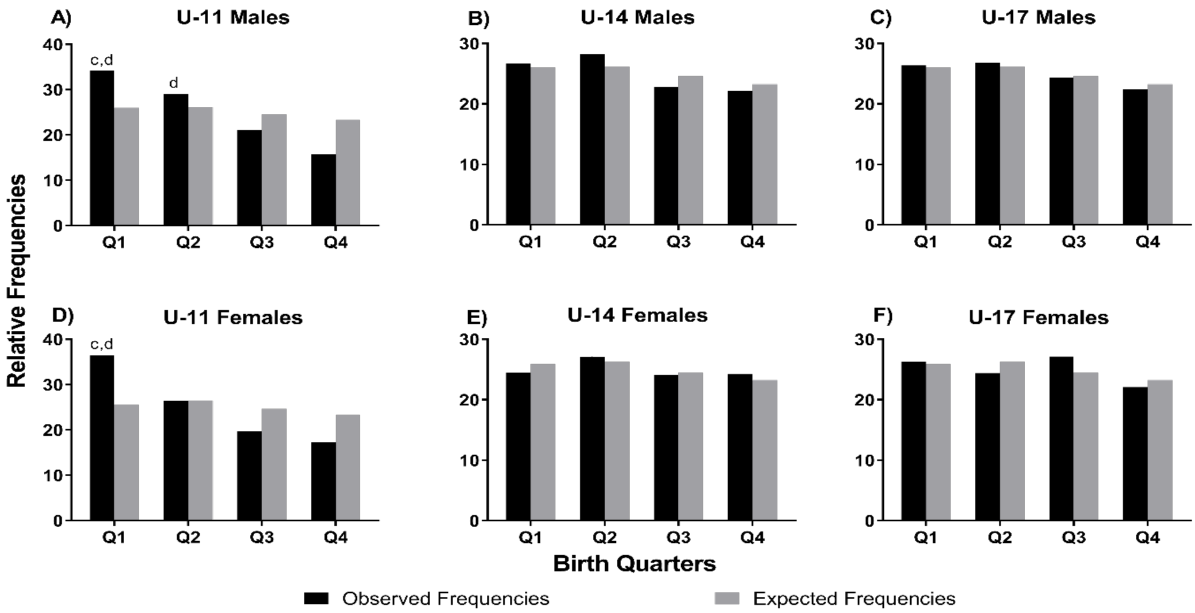

Figure 2. Relative distribution of the quarters of birth for (A) U-11 Males, (B) U-14 Males, (C) U-17 Males, (D) U-11 Females, (E) U-14 Females, and (F) U-17 Females.
Note: c = different from Q3; d = different from Q4; Q1;Q4 = birth quarters of the year.

DISCUSSION

The present study aimed to analyze the presence of RAE in a sample of Brazilian team sports school athletes according to sex and age categories. Our results confirmed our initial hypotheses, and are in line with previous research that indicated that RAEs are more pervasive in male sports settings than in female ones (Figueiredo et al., 2021; Lidor et al., 2021; Romann et al., 2018), even in a population of school athletes, whose level of competitiveness is lower compared to club athletes. Moreover, the notion that RAE tend to reduce as age increases was also confirmed in our study, since RAE was only present in the lower category analyzed.

The analysis of the entire sample showed that relatively older student-athletes were overrepresented, on the overall. Although the RAE was reported in this population of school-athletes, the magnitude of this effect was small, compared to studies that investigated more competitive contexts such as national competitive school athletes or club athletes (Cobley et al., 2009; Romann et al., 2018). When male and female athletes were analyzed separately, the overrepresentation of athletes born in the first semester was found only in male athletes. These results are in line with previous research that demonstrated larger RAEs in male children and adolescents compared to female ones (Lidor et al., 2021; Romann et al., 2018; Vincent & Glamser, 2006). The "depth of competition hypothesis" (Musch & Grondin, 2001) is a possible explanation for the aforementioned finding. This mechanism would operate as follows: the greater the number of athletes competing for spots on teams, the greater the chances of RAEs occurring in this sport system (Musch & Grondin, 2001). The higher competition for spots in higher tiers of competition and in male sports settings compared to female ones allow coaches to select more relatively older athletes, as these are more likely to be physically and physiologically advantaged compared to their relatively younger peers, due to developmental aspects associated with chronological age differences (Cobley et al., 2009; Malina, 1994; Mirwald et al., 2002). The notion that males participate on a greater extent than females in competitions was previously reported in Brazilian elite sports (Figueiredo et al., 2020; Morales Júnior et al., 2018), and is now reported in this study, in the school sports context.

The age categories analysis showed an overrepresentation of athletes born in the first semester only in the U-11 category. Further analysis indicated that RAEs were present for both males and females in this age category. These findings are partially in line with results from previous meta-analyses (Cobley et al., 2009; Smith et al., 2018). In a review with a predominantly male sample, Cobley et al. (2009) indicated that higher RAEs were more likely to occur in the adolescence (after 12 years). This is a period in which differences in physical and physiological aspects that influence sports performance are accentuated in males (Folgado et al., 2021; Musch & Grondin, 2001) due to the pubertal growth spurt (Malina, 1994). On the other hand, Smith et al. (2018) performed a review with female sample, and found that higher magnitude RAEs were more likely to occur in pre-maturation categories (such as the U-11), which is in line with our findings. The rationale behind our results suggests that pre-maturation RAEs are associated to normative biological growth disparities (e.g., stature, body mass, motor coordination, muscular force) and to psycho-social factors (e.g., parental and children choices) (Smith et al., 2018). The U-11 category in our study comprised athletes from 9 to 11 years, which may represent up to 11,11% longer lifespans for relatively older athletes compared to their younger peers. This increased lifespan may represent more practice time, more experiences and more opportunities for motor and cognitive development, which may interfere with the coaches' perception of talent (Mirwald et al., 2002). This is probably accentuated in the grassroots categories, where competition for spots in the teams seems to be greater. The school coaches' predilection for more physically mature athletes (in general athletes born in the first semester) suggests a pursuance for early sportive results, which does not agree with the basic premises of the sports talent development. Previous evidences have consistently shown that long-term sportive success is not dependent on excelling in younger categories (Barreiros et al., 2014; Kearney & Hayes, 2018). Thus, changing the coaches' conception during selection processes is warranted, in order to emphasize tactical, and psychological aspects (Figueiredo et al., 2022), as well as the skill assessment, instead of performance factors that are highly influenced by physical attributes (Gonçalves & Carvalho, 2021; Schorer et al., 2015).

In the U-14 and U-17 categories no RAEs were found, regardless of sex. Moreover, the effect sizes reduced as categories increased in our study, which has been shown in other sport contexts (Figueiredo et al., 2021; Saavedra García et al., 2015). The fact that our sample was composed of low competitive sports teams may explain these results, as the level of competitiveness is one of the factors that modulate RAE (Wattie et al., 2015). Unlike in elite sport, in which competition for spots is fierce in every category, the same does not occur in the school sports setting, with fewer athletes competing for spots. As a matter of fact, Brazilian adolescents shows low sports participation rates (Maillane-Vanegas et al., 2018), which corroborates a smaller participation in organized school team sports. Even though we did not assess this factor in this study, we speculate that as age advances, fewer and fewer athletes participate in the selection processes for school teams. Shifting social pressures, competing priorities and physical factors are some reasons that affect adolescents' interest in sports participation (Crane & Temple, 2015). As a decreasing number of athletes competing for spots is expected, RAE would then be less likely in older age categories.

Understanding the RAE in a given context is complex, since this is a multifactorial phenomenon (Wattie et al., 2015). Specific social contexts, parents support, the maturational level of athletes and physical performance are factors that may affect the occurrence and magnitude of RAE (Cobley et al., 2009). This information was not available in the present study, which represents a limitation. Another limitation was grouping athletes from different modalities in the same analysis. Even though this allowed us to draw reliable conclusions due to a larger sample, this grouping is troublesome since selection mechanisms are affected by specific sports demands, which may affect RAE (Schorer et al., 2015). However, this limitation does not compromise the findings of the present study, considering that sports modalities analyzed have similar characteristics in relation to physical and physiological demands and task constraints. Future studies are warranted to investigate individual sport modalities, in order to verify how RAE operates in these different modalities. Furthermore, longitudinal investigations that keep up with the outcome of these athletes' sports careers can bring important insights to coaches and policymakers with regard to the development of sports talents in the school context.

CONCLUSION AND PRACTICAL IMPLICATIONS

In conclusion, we found that the RAE phenomenon seems to be present in the early categories of school team sports, although to a lesser extent compared to contexts of greater competitiveness. Nevertheless, this result is relevant for school coaches and sports administrators, considering that RAE can increase sports dropout rates and hinder the access to higher tiers of competition by relatively younger practitioners (Helsen et al., 1998). Considering that the main focus of school sport is educational, and that the largest number of children and adolescents should have the opportunity to explore their potentials (Tani, 1996), RAEs must be reduced to a minimum or even eliminated from this sport system.

Considering the pursuit for a more accessible school sports system, policies to minimize RAEs in younger tiers are warranted. The education of coaches and sports administrators regarding the RAE seems to be the first step, as many coaches may conduct selection processes without the awareness that relatively younger students are systematically disadvantaged (Musch & Grondin, 2001). Another possibility to reduce inequalities, is the use of numbered shirts according to the athletes' birthdates during the selection (Mann & van Ginneken, 2017). This would allow coaches to consider developmental aspects associated with age more easily when selecting players. Changing the rules of school competitions is another way to reduce the inequalities generated by RAE. Proposing a minimum number of players born in the second semester to participate in a competition or even reducing the age group cohorts (Reed et al., 2017) are policies that should be considered by school sports entities. Finally, encouraging the participation of younger athletes (U-11) in sport festivals instead of formal competitions could minimize coaches' search for short-term performance, thus reducing the occurrence of the RAE in the grassroots levels of the school sports system. The fact that school competitions tend to have more flexible rules, especially in younger categories, should be seen as a great opportunity for the implementation of counter-RAE policies.

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