RELATIVE AGE EFFECT IN U-16 ASIAN CHAMPIONSHIP SOCCER TOURNAMENT

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Abstract

Athletes born at the beginning of the year may present advantages in terms of physical characteristics, motor ability or cognitive knowledge that could increase their chances for selection against their peers. This circumstance could lead to the over-representation of older athletes in an age-defined competition, a phenomenon commonly referred to as relative age effect (RAE). Although, a number of studies have demonstrated that RAE is apparent in youth soccer, such studies rarely investigate the performance advantage that likely exists across the birth month of the athletes. The current study aims to determine the presence of RAE in the under 16 Asian Football Confederation Championship (AFC); investigate the effect of RAE on the team qualification success; as well as ascertain the existence of RAE in choice of playing position amongst the soccer players. Data for the 2018 AFC under 16 qualifications matches were obtained from the AFC. A total of 719 players from 32 countries participated in the qualification competitions. Chi-square for goodness fit is used to determine the existence of the RAE across the players' month of birth while logistic regression is applied to analyze the differences of the quartiles' distribution with respect to the quartile, qualification status (qualifier or non-qualifier) as well as the playing position of the players. The results demonstrate the presence of RAE in the AFC under 16 soccer tournaments [$\chi2(4) = 21.53$; $p < 0.001$] with the largest number of older players dominating the qualified team. Likewise, a substantial difference is observed with regards to the quartile and various playing positions of the players at $p < 0.05$.

Keywords: Relative Age Effect, Asian Confederation Cup, Quartile Distribution, Soccer

Introduction

Competitions in youth categories are normally held within specific age groups. In internationally organised youth soccer competitions, the age groups typically comprises players born between 1st January to 31st December of the competition year. This age categorisation implies that the players could differ in age by up to 12 months. As such, the growth and maturation, as well as motor competency amongst the players, may present a colossal variation, which is often considered as an important parameter influencing the selection of the players for a competition (Williams, 2010). The variation in the chronological age between the players in a particular age group is referred to as relative age, while its implications are refered to as the Relative Age Effect (RAE) (Musch & Hay, 1999).

Research demonstrates that the athletes who are most successful in a certain competition are comparatively the oldest competitors within the age group (Campos, Campos, Pellegrinotti, & Gómez, 2017; Satoh, 2015). In other words, the athletes born at the beginning of the cut-off month tend to outperform their peers. These effects have been established in a varying number of sports in which the proportion of the birth date is largely skewed in favor of the athletes born at the beginning of the selection year (Cobley, Baker, Wattie, & McKenna, 2009; McCarthy, Collins, & Court, 2016; Mulazimoglu, Bayansakduz, Kaynak, & Mulazimoglu, 2016). However, it should be noted that RAE is likely to be more pronounced in physically demanding sports, in which the athletes born at the beginning of the selection year possess a physical edge over their counterparts.

Prior investigations have demonstrated a significant existence of REA in physically demanding sports such as ice hockey (Larouche, Laurencelle, Grondin, & Trudeau, 2010), American football (Glamser & Marciani, 1992), basketball (Ibáñez, Mazo, Nascimento, & García-Rubio, 2018; Schorer, Neumann, Cobley, Tietjens, & Baker, 2011), baseball (Thompson, Barnsley, & Stebelsky, 1991), cricket (Edwards, 1994)as well as tennis (Baxter-Jones, 1995). These sports feature RAE due to fact that physical attributes and ability such as weight, height as well as strength are prerequisites to the attainment of success in those sports. Nevertheless, it is worth to mention that RAE is not apparent in sports such as gymnastics, dance, table tennis and golf, in which physical ability and attributes are not significant determinants for success, rather than motor as well as technical skill involving flexibility, speed and accuracy (Côté, Macdonald, Baker, & Abernethy, 2006; Delorme, Boiché, & Raspaud, 2010; van Rossum, 2006).

Numerous investigations from different nations have confirmed the existence of RAE in soccer (CAMPOS et al., 2017; da Costa, Albuquerque, & Garganta, 2012; Mujika* et al., 2009; Mulazimoglu et al., 2016; Sallaoui, 2014; Williams, 2010). Although the studies have demonstrated that RAE is apparent in the sport of soccer, such studies barely investigate the performance advantage that may likely occur across the birth month of the athletes. The current study aims to ascertain the presence of RAE in the Asian Confederation Cup; investigate the effect of RAE on the team success; as well as analyze the presence of RAE in playing positions amongst soccer players.

Materials and Methods

Data acquisition and treatment

The AFC U-16 Championship is a soccer tournament organised by the Asian Football Confederation (AFC). The competition is held once every two years for Asian under-16 soccer players. It should be noted that the competition equally serves as a qualification platform for the FIFA U-17 World Cup. The competition is based on the players' ages within the calendar year, i.e. between 1st January to 31st December, which reflects that a player turning 15 within the aforesaid months could be eligible to participate in the competition. For the present study, data from the 2018 AFC under 16 qualifications matches were provided by the AFC with the approval of the AFC Medical Committee. A total of 719 players from 32 countries participated in the qualification competitions.

The data is inclusive of the players' dates of birth, i.e. day, month and year, as well as the positional roles of the players viz. goalkeeper (GK), defender (DF), midfielder (MF), and striker (FW). The players were distributed into the cut-off month of Q1 (January to March), Q2 (April to June), Q3 (July to September), Q4 (October to December) and Q5 who are categorised as the under-age players born after the cut-off year of the competition.

Data analysis

In the present study, the chi-square for goodness fit was used to determine the existence of the RAE across the players' birthdate distribution based on their quartile distributions while logistic regression was applied to analyze the differences between the quartiles' distribution with respect to cutoff date, qualification status (qualifier or nonqualifier) as well as the playing position of the players. All inferences were set at an alpha (α) level of ≤ 0.05 using the SPSS statistical software package (SPSS Inc., Chicago, IL, USA, 20.0).

Results and Discussion

Table 1 depicts the birth-date apportionment of the players in accordance with playing position. It could be observed from the table that the positional roles of the players were fairly distributed across the quartile distributions revealing a relatively even representation from each playing position. Moreover, a statistically significant difference may be observed in the quartiles and the playing positions ($p < 0.05$), a higher representation from the first quartile with an overall percentage of 33.80 is detected. Q1, Q2 and Q3 represented total percentagea of 25.10, 16.90 and 14.00 respectively. Indeed, the lowest representation is attributed to under-age players, who only constitute 10.20 percent of the total observations. These findings demonstrate that the distribution of the under 16 Asian soccer players does significantly differ based on their various playing positions. This finding is synonymous with a previous study which reported a significant variation amongst the various national soccer teams participated in the under 20 world cup with regards to the players 'playing position (Da Silva, Padilha, & Da Costa, 2015). The symmetric distribution of the players based on their positional role could reflect the nature

of the soccer, in which the success of the players in the youth category is reliant upon physical maturation, cognitive skills as well as somatotype that might likely be associated with a specific positional roles (Salinero, Pérez, Burillo, & Lesma, 2013).

Table 1: Number of players in each quartile category according to their playing position (n: %)

Positions	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile	5Q Under-age	χ^2	P
GK	34	24	12	20	11		
	(12.8%)	(12.2%)	(9.0%)	(18.2%)	(13.8)	17.66	0.001
DF	75	69	35	41	28		
	(28%)	(35.0%)	(26.3%)	(37.3)	(35.0%)	35.79	0.000
MF	94	70	54	25	25		
	(35%)	(35.5%)	(40.6%)	(22.7%)	(31.2%)	65.99	0.000
FW	63	34	32	24	16		
	(23.7%)	(17.3%)	(24.1%)	(21.8%)	(20.0%)	37.54	0.000
Total	266	197	133	110	80		
	33.80%	25.10%	16.90%	14.00%	10.20%		

The logistic regression analysis in Table 2 demonstrates that those athletes born at the beginning of the year, i.e. Q1, have a significantly higher representation in the competition as compared to the other athletes born in the subsequent years (Q2-Q5). This result provides evidence that the cut-off month of the athletes largely influence the selection of the players. The athletes who are born at the beginning of the year are more likely to be selected for competition compared to those born in the previous quarter. A persistent prevalence of RAE has been reported in various leagues and international tournaments. A study of RAE was carried out on a number of European leagues namely; Belgium, French and Dutch (Verhulst, 1992). The data from that study revealed that the higher proportion of the players were born in the first six months of the year. Moreover, it has been reported that more than 55% of the players within the Brazilian, German as well as the Japanese leagues are older by about six months in comparisons to their peers (Musch & Hay, 1999). This evidence suggests that soccer players born early in the selection year do have a higher chance of being selected for competition, providing a rationale of their dominance of youth soccer.

Table 2: Pairwise comparisons of the RAE according to the quartile categories

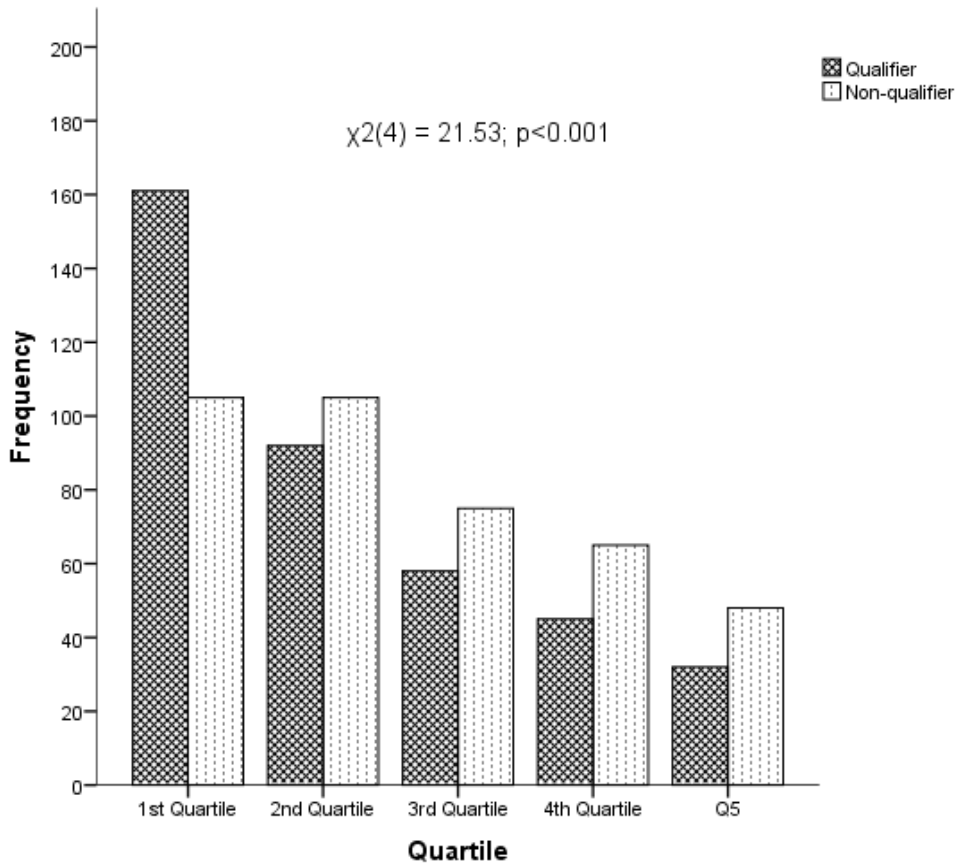| Quartile	DF	χ^2	P
Q1 vs Q2	1	8.69	0.003
Q1 vs Q3	1	10.12	0.001
Q1 vs Q4	1	11.85	0.001
Q1 vs Q5	1	10.23	0.001
Q2 vs Q3	1	0.306	0.580
Q2 vs Q4	1	0.957	0.328
Q2 vs Q5	1	1.031	0.310
Q3 vs Q4	1	0.180	0.672
Q3 vs Q5	1	0.267	0.606
Q4 vs Q5	1	0.016	0.900

Figure 1: Chi-square analysis according to the quartile and the qualification status

Figure 1 shows the quartile distributions and qualification status. It can be observed from the figure that the players' quartile and the qualification status significantly differed. A larger proportion of the players that are within the first quartile belong to the qualified team. On the other hand, a substantial number of players born at the subsequent quartiles dominate the non-qualifiers team category. This finding could therefore support the general assumptions that the players born early in the year have presumably more experience and thus, account for their apparent dominance in any age-defined competitions. This argument could be supported by the preceding researchers who reported that the players born early in the year might be associated with considerably larger body size, higher muscle power, strength as well as motor competency when compared to their counterparts(da Costa et al., 2012; Helsen, Starkes, & Van Winckel, 1998; Mulazimoglu et al., 2016). These physical advantages pose a greater challenge for bridging the gap of RAE in sports, since older athletes are considered more talented by virtue of their physical attributes. This reason accounted for the skewed distribution observed in the birth-month of soccer players in under 15, 16, 17 and 18 of ten countries that took part in the various international youth soccer competitions (Helsen et al., 1998).

Conclusion

The purpose of the present study was to determine the presence of RAE in 2018 AFC Under 16 Qualifiers, investigate the effect of RAE on the team success as well as ascertain the existence of RAE in the playing position amongst the soccer players. It was established from the results of the data gathered that there is a presence of RAE in the 2018 AFC Under 16 Qualifiers tournament with the most significant number of older players dominated the qualified team. Furthermore, a substantial difference has been observed based on the birth-month and various playing position of the players. RAE is viewed as an element of concern in every aspect of sports. To this regard, many attempts have been made to avert this phenomenon by various researchers and concern stakeholders. However, the trend seems to be growing at an alarming rate. To curtail this problem, by given advantage to the younger athletes, developmental disparity should be taken into account during the early age talent identification and development processes. Moreover, sport specific tests should be designed in such a way that they provides equal opportunities to younger athletes. The detection of late maturity with respect to physical as well as physiological variables should be considered in the process of talent selection to prevent dropout and wastage of talent.

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