RELATIVE AGE EFFECT AMONG WORLD RUGBY UNDER 20 CHAMPIONSHIP 2019 PLAYERS

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Abstract

This study aimed to investigate the presence of Relative Age Effects (RAE) with based on birth quartiles among the World Rugby Under 20 Championship 2019.Besides that, this study also determined the presence of RAE among present of one successful team and the unsuccessful team. Date of birth, height, weight, playing position from players (n=305) from all the 12 participating teams in the tournament were gathered from official websites. The players' birth dates were categorized into four quartiles according to each country cut-off date. Countries such as Australia, New Zealand, South Africa, Argentina, Fiji, France, and Italy was set at 1st January, while for countries under United Kingdom (England, Wales and Scotland), Ireland and Georgia were set at 1st September. Chi squared goodness fit test was used to compare the distribution of players among the birth quartile and also the playing position and the team's achievement (successful and unsuccessful). One-way ANOVA test was used to determine whether there were any statistical significant differences between the birth quartile and player's height and weight. Presence of RAE was found in the overall position of rugby union players, and the teams that qualified for semis (deemed successful). Analysis on the playing positions found only the backline position showed presence of RAE but not among the forwards. Furthermore, there was no significant different between birth quartiles and player's height and weight. As conclusion, the overrepresentation of relatively older players among World Rugby Under 20 Championship 2019 players were suggested due to the player's selection process and playing roles according to nature of the sport.

Keyword: *Relative Age Effect, Rugby Union, Birth Quartile.*

INTRODUCTION

In ensuring athletes compete at the same level of competition, age group sport organizers distributed the athletes into chronological age cohorts (Till et al., 2010). The eligibility to compete in a particular age bracket was based on a specific cut-off date (e.g. 1st January) (Kearney, 2017b).1st September is used as the cut-off date for all ages and performance level except for the Under 18 male category and the southern hemisphere professional players whereby their cut-off date was on 1st January (Till et al., 2010). This process leads to a phenomenon where more relatively older players are selected compared to the relatively younger player in the same age group and is termed as relative age effect – RAE (Jones, Lawrence, & Hardy, 2018). The phenomenon occurs when greater number of relatively older players were selected more than relatively younger players in the team, and it was because of their maturation state (Heneghan & Herron, 2019).

A recent study by Grobler, Shaw, & Coopoo, (2017) found presence of RAE indicating the number of players born in the first quartile (Jan-Mac) were higher than those born in the fourth quartile (Oct-Dec) among the under 13 to under 16 age groups rugby union players in the Gauteng province in South Africa and suggested that the maturation theory was the possible reasons why RAE was presence. A clear bias of relatively older players was also found in national youth teams of England during the initial talent identification stage but a reverse result of RAE was found during the conversion of talent stage (transition from youth team to senior team) (McCarthy, Collins, & Court, 2016). The different result found in both youth and senior during the conversion of talent stage was because of positional variations and physiological differenced as well as physical and skill factors. The presence of RAE in both of these studies were supported by the finding of RAE among the age grade rugby players in Wales, aged 7 years until 19 years old. An over-representation of players that were born in early year (first quartile- Q1) was found in all age categories in club, district, regional age grade and national age grade (Lewis, Morgan, & Cooper, 2015).

The examination of RAE on different playing positions in team sports appears to attract researchers for better insight into the phenomenon. A study of playing position in rugby union,

found a presence of RAE among the forward positions but none among the defender/backline positions (Kearney, 2017a). A certain physical demands explained why an over representation of forward players was found in this study. Similar study was conducted from different countries (i.e., New Zealand and England) reveled no RAE among the forward players but and over representation of players was found among outside backs in New Zealand and half backs position in England (Kearney, 2017b). The presence of RAE was because the selection trend that tend to select players based on maturation status rather than future potential of the players. Besides, a finding of forwards position was under-represented while the defenders/backlines position was over-represented was found by Jones et al., (2018). The study was conducted on current and past international rugby union players (n =690) using the data on the webpage (https://www.world.rugby/rankings). The countries that involved in this study were New Zealand, South Africa, Ireland, England, Australia, Wales, France, Scotland, Argentina and Samoa and the criteria for the players to be included in this study was having at least a minimum of 1 international cap between the year of 1994 until 2014. The result of this study explained that the maturation advantages were no longer available as it would not sustain. However, there was limited research to date that evaluate the influence of relative age effects on playing position and the players' stature in rugby union. Another objective of this study was to examine the presence of RAE among the successful (qualified for semifinals) and unsuccessful (did not qualify for the quarter finals) teams in the World Rugby Under 20 Championship 2019.

PROCEDURES / DESIGN

The data used in this study was the date of birth for all the players that represented their respective country in the World Rugby Under 20 Championship 2019. A full details dataset (height, weight, and playing position) of players were collected from the official website that provide information for rugby teams that participated in the tournament, Worldrugby.org (https://www.world.rugby/u20/teams). This web site provided details of all team players. For the results, the data was retrieved from Worldrugby.org. (https://www.world.rugby/u20/ standings). The data also collected from some of the teams' official websites.

This was designed as performance analyze with seconder data gained from World Rugby data base concerned. There were 305 players from 12 teams that participated in World Rugby

Under 20 Championship 2019 were involved in this study. Raw data for each player (date of birth, height, weight, and playing position) were transferred into Microsoft Excel. The collection of date of birth from various players and team then were categorized into groups of the four quartiles depends on their country cut-off date. As for the southern hemisphere's countries such as Australia, New Zealand, South Africa, Argentina and Fiji, their cut-off date was set at 1 January (Grobler et al., 2017; Kearney, 2017b; Lemez, MacMahon, & Weir, 2016; Till et al., 2010). The same case applied to France (Delorme, Boiché, & Raspaud, 2009) and Italy (Brustio et al., 2018), their cut-off date also set on 1 January. While for the countries under the United Kingdom (England, Wales, Scotland) (Lewis et al., 2015; Till et al., 2010), Ireland (Lemez et al., 2016) and Georgia, Education System In Georgia (https://www.scholaro.com/pro/Countries/ Georgia/Education-System), their cut-off date was set at 1st September.

Table 1: The classifications of birth months into quartiles (Q) 1, 2, 3 and 4 for the players from New Zealand, Australia, South Africa, Argentina, France, Fiji, and Italy

Quartile(Q)	Month
1	January – March
2	April – June
3	July – September
4	October – December

Table 2: The classifications of birth months into quartiles (Q) 1, 2, 3 and 4 for the players from England, Wales, Scotland, Ireland, and Georgia

Quartile(Q)	Month
1	September-November
2	December- February
3	Mac-May
4	Jun-August

DATA ANALYSIS

The birth month of the players were compared by using Chi-square goodness-of-fit test, according to the players playing position and also the team achievement such as semi-finalists vs the team that did not qualify for the quarters finals (Fonseca, Figueiredo, Gantois, Lima-Junior, & Fortes, 2019). The test was chosen as the birth month data is non parametric. Chi-Square goodness of fit test was used to calculate the frequency of the rugby players born in each quartile as well as to

compare it in order to determine the observed and expected distribution of the birth date. Post-Hoc test for statistically significant Chi-square analysis was in the form of standardized residuals (SRs). The calculation for standardized residuals: SR = F-G/√G, observed (F), expected (G). The value in indicating an overrepresentation was set at ≥1.96, while a value of ≤ -1.96 indicated an underrepresentation in relation to the relative age distribution (Hancock, Young, & Ste-Marie, 2011). Then one-way ANOVA test was used to determine whether there were any statistical significant differences between the mean of birth quartile and player's height and weight. The analysis was performed by using the Statistical Package for Social Sciences (SPSS) version 23.0 (Chicago, USA). Statistical significance was set at 5%.

RESULTS

Overall Distribution of Position with Birth Quariles

Table 3: Overall Distribution of Player Position According to Birth Quartiles

Birth Quartiles	Observed (N)	Expected (N)	SR	*P*
Jan - Mac (Q1)	82	76.3	0.65	
Apr - Jun (Q2)	93	76.3	1.91	
Jul - Sep (Q3)	77	76.3	0.08	
Oct - Dec (Q4)	53	76.3	-2.66	
Total	305			0.011

Chi-square goodness of fit test indicated a significant relative age effect $\chi 2$ (3, N = 305) = 11.21, p = .011 and presence of relative age effect on overall distribution of positions was shown in Table 3. An underrepresentation of players was found among the players that were born in the Q4/Oct-Dec (n=53), where a negative standardized residual (SR= -2.66) was found indicating the Q4/Oct-Dec players were significantly lesser than others.

Distribution of Backline Position with Birth Quartiles

Table 4: Distribution of Backline Positions According to Birth Quartile

Birth Quartiles	Observed (N)	Expected (N)	SR	*P*
Jan - Mac (Q1)	37	32.8	.73	
Apr - Jun (Q2)	39	32.8	1.08	
Jul - Sep (Q3)	38	32.8	.91	
Oct - Dec (Q4)	17	32.8	-2.76	
Total	131			.017

Table 4 showed a significant distribution among backline positions $\chi 2$ (3, n = 131) = 10.16, p =.017 and presence of RAE among the backline position. An under representation of players was found in the Q4/Nov-Dec (n=17), where a negative standardized residual (SR = - 2.76) was found indicating a number of players in Q4/Nov-Dec were lesser than the others. However, there was no significant unequal distribution among forward position.

Team Performance

Table 5: Teams That Qualified for Semis (Successful)

Birth Quartiles	Observed (N)	Expected (N)	SR	*P*
Jan - Mac (Q1)	39	26.3	2.5	
Apr - Jun (Q2)	29	26.3	.53	
Jul - Sep (Q3)	22	26.3	-.84	
Oct - Dec (Q4)	15	26.3	-2.2	
Total	105			.007

The successful teams during World Rugby Under 20 Champions were France, Australia, South Africa, and Argentina. While the unsuccessful teams were Italy, Georgia, Fiji, and Scotland. The result in Table 5 indicated $\chi 2$ (3, n =105) = 11.99, p = .007 and presence of RAE among teams that qualified for semis as shown in Table 5. Post-hoc test indicated that the Q1 (Jan-Mac) had the highest value (SR=2.5). An under representation of players was found in the fourth quartile/Oct-Dec, whereby the value was (SR= -2.22). However, no presence of RAE was found among the unsuccessful teams.

Player's Height & Weight

Table 6: Height and Weight According to Birth Quartiles

		N	M	SD	df	F	*p*
Height	Jan-Mac	82	1.85	0.07			
	Apr-Jun	93	1.87	0.06			
	Jul-Sep	77	1.85	0.06			
	Oct-Dec	53	1.86	0.07			
	Total	305	1.86	0.07	3	1.49	0.22
Weight	Jan-Mac	82	96.49	14.09			
	Apr-Jun	93	100.47	12.98			
	Jul-Sep	77	98.56	13.41			
	Oct-Dec	53	101.53	14.00			
	Total	305	99.10	13.63	3	1.94	0.12

Table 6 indicated, there was no significant difference between birth quartiles and player's height, F (3,304) =1.49, p = .22 and there was no significant difference between birth quartiles and player's weight, F (3, 304) = 1.94, p = .12. The results between height and weight of players in forward and backline position also revealed with a no significant different.

DISSCUSSION

The present study demonstrated, a presence of relative age effect among World Rugby Under 20 Championship 2019 players. The result indicated a significant of relative age effect (3, N = 305) = 11.21, p = .011. An underrepresentation of players that were born in the fourth quartiles (Q4, n=53) and indicating the number of players in this quartile were lesser than the others (SR= - 2.66). Hence, the current study result supported the finding of a clear bias of representative from the rugby union players born in the first quartile (Q1) and second quartile (Q2) toward the late born (Q3&Q4) (McCarthy et al., 2016). Furthermore, a few studies also found early born was overrepresentation than later born in rugby union (Grobler, Shaw, & Coopoo, 2016; Lewis et al., 2015). However, the result of the present study contradicted the findings of the players who were born in the fourth quartile (Q4) were overrepresented compared to those born in the early year (Q1) (Jones et al., 2018). The current findings explained that, the selection process of player in the teams that participated in World Rugby Under 20 Championship 2019, depended on players who were relatively older. The players experience might help them to be selected into the team and became an advantage for them as the early born (González-víllora, Pastor-vicedo, & Cordente, 2015).

Furthermore, this study found the backline positions with related birth quartiles showed a significant result of relative age effect $\chi 2$ (3, n = 131) = 10.16, p =.017. This situation appeared because of positional requirement (play role) in the selection process of backline players, which required the players to have high tactical thinking, decision making, superior agility, speed and also high defensive ability (tackling,), similar to the requirements in American football (Heneghan & Herron, 2019). Jones et al., (2018) found a significant relative age effect in backline position among the top 10 international ranked rugby teams in 2014 using the World Rugby official

rankings. This result supported the current result, where relative age effects were found among the World Rugby Under 20 Championship 2019 players. Findings by Till et al. (2010), on the study of relative age effect on UK Rugby League players also supported the current findings.

However, current finding on relative age effect among the forward position with birth quartiles in World Rugby Under 20 Championships was contradicted, whereby an evident of relative age effect existed within forward position players (Kearney, 2017b, 2017a; Till et al., 2010). Somehow, the current finding showed no evidence of relative age effects among forward in World Rugby Under 20 Championship 2019 $\chi 2$ (3, n = 174) = 4.35, p = .23. Height and weight among the forward players were almost the same became the reasons why there was no presence of relative age effect among the forward position in current study.

The result showed no significant difference between the height and weight of players according to the birth quartiles. It was shown in the forward and backline position, where there was no significant different between the weight and height on both position's birth quartiles (weight, p = 0.124; height, p = 0.218). The mean of weight and height among the birth quartiles for both positions were almost the same.

The teams in the top four ranked (successful teams) in the World Rugby Under 20 Championship 2019 were France, Australia, South Africa and Argentina. Within the teams that qualified for semis, it was found, there was a significant $\chi 2$ (3, n = 105) = 11.99, p =.007 of relative age effects among them. A high number of players born in the early quartile among the successful teams become an advantage of the teams.

The older players could perform better than the team that had less number of older players due to the experienced of the older players. The given opportunity for the relatively older players to be selected into team, making them to gain new experience in each competition (González-víllora et al., 2015). While for the teams that did not qualify into the quarter (unsuccessful teams) were Italy, Georgia, Fiji, and Scotland. The result of no presence of relative age effect $\chi 2$ (3, n =103) = 1.58, p = .66. was found among the teams that did not qualified for quarters.

CONCLUSION

It concluded that, among the World Rugby Under 20 Championships 2019 players, there was a presence of relative age effect with birth quartile concerned among them. Furthermore, the positions for backline in rugby union were affected by the relative age effect but not for the forward positions. No differences between the birth quartiles and the height and weight of players either successful or unsuccessful teams considered. Besides this, a relative age effect with birth quartiles was clear evident among the team that qualified for semis. A clear bias on player's selection explained the presence of relative age effect which birth quartiles as baseline concerned among the World Rugby Under 20 Championships 2019 players. Either may considered it was also influenced by the positional requirement (playing roles) as far as nature of this Sport.

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