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**Research article**

**THE RELATIVE AGE EFFECTS AMONG MALAYSIAN AGE GROUP SWIMMERS**

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**Abstract**

*Journal of Sports Science and Physical Education* 3(1): 1-8, 2015 - The relative age effect (RAE) is the effects of differences between athletes born in the early compared to the later months of the year. This study investigated the presence of RAE among 306 age-group swimmers competing in the 2014 Malaysian Schools Sports Competition (MSSM). Participants' birthdates were grouped according to four birth quartiles (Q1- Jan to Mar; Q2- Apr to June; Q3 – July to September; Q4 – October to December). Data analyzed using chi-squared goodness-of-fit showed there was a significant difference among overall male but not for the female swimmers. There was a presence of RAE in the U-12 and U-15 but none in the U-18 boys' category. Further analyses on the medal winners showed no RAEs on both gender. Physical attributes of the male swimmers, especially the early adolescents are suggested to influence the relative age effects in swimming.

**Keywords:** *Birth-date difference, age-group swimmers, Malaysian schools.*

**Introduction**

A large number of research has shown that month of birth can have an effect on sport achievement when children are grouped by

age (Glamser & Vincent, 2004). Children are frequently grouped by age for school or sport activities in order to control the effects of intellectual and physical development. The purpose of this practice is also to ease the administration of organizing large cohorts of participants. As a result, some children will be almost a year older than other children where the outcome of this advantage has been termed the relative age effect (Glamser & Vincent, 2004). Relative Age Effect (RAE) refers to the performance-related advantage of being born early in a selection year (Nakata & Sakamoto, 2011). Related literature has shown that the age differences within a year can have extremely large effects on sports success, especially in elite levels (Delorme, Boiche & Raspaud, 2009; Glamser & Vincent, 2004; Okazaki, Keller, Fontana & Gallagher, 2011).

Based on previous research examining the effects between genders in elite sports, a presence of RAE was found among boys than girls (Delorme et al., 2009). The research among both elite male and female French athletes during the 2005 to 2006 season in professional championships in a variety of sports such as soccer, basketball, handball, ice hockey, volleyball and rugby union revealed that a significant RAE among elite male athletes in ice-hockey players, but only moderate RAE was found

among basketball, volleyball and soccer players. There were no RAEs found in handball and rugby players which most of the players were born in second quartile of the year. The study also revealed that although there was no significant RAE found among female athletes, which most of the players were born on third quartile of the year (Delorme et al., 2009). One possible explanation for this difference could be that there is less competition among girls to gain a position on an elite team, and if an activity is far more popular among boys and girls in a given country, and if similar elite structure is match with selection system it is not surprising to find higher RAEs among boys than among girls (Delorme et al., 2009).

Study on RAE by Ryan (1989) which involved swimming, soccer, team handball and volleyball games showed that significant RAE were found in soccer and handball players among both gender. However, only female swimmers demonstrated RAE meanwhile in volleyball, only male players showed RAE (Ryan, 1989). Another study of RAE among female youth Brazilian volleyball players under age of 14 years showed a strong RAE was found among the players which 74% of the players were born on the first quartile of the year (Okazaki, Keller, Fontana & Gallagher, 2011). This study revealed that the presence of RAE was due to the age of the participants, contradicting another study which suggested that younger participants may not be affected by social pressure, which means the influence that is exerted on a person or group by another person or group (Ford & Williams, 2011).

Researchers have attempted to investigate if the better athletes are also early born. The study among award-winning athletes in male professional team sports like soccer, ice-hockey, baseball and football indicated that no RAE was found among all the players (Ford & Williams, 2011). A

higher percentage of award-winning athletes were born in the second quartile compared to the percentage born in the first quartile. However, in a study on the presence of RAE among Beijing Olympic athletes in both team and individual sports on African, European and Asian athletes revealed a significant RAE in both gender (Romaneiro, Folgado, Batalha & Duarte, 2008).

All the research discussed above showed reported conflicting findings in gender and in different type of sports. Most of the studies on RAE examined team sports and few studies were conducted on individual sports. The unequivocal results of the RAE could be influenced by the education, geographic and economic structure of a particular country. The Malaysian education system promotes active participation in sport through its 1Student 1Sport policy. Although the intention is noble (i.e., to encourage sports participation from early age), this policy may also inevitably cause those who are more advanced physically to be more likely to be selected. Therefore, there is a need to examine if the RAE phenomenon exists in Malaysia. There has been not much attempt to investigate the RAE among the elite age group athletes in Malaysia. The purpose of the study was to examine the presence of RAE among male and female age group swimmers competing in the Malaysian Schools Sports Council annual meet. Based on previous RAE research among male and female athletes, we hypothesized that there would be a significant RAE among the male but not for the female swimmers. It was further hypothesized that the medal winners would not be affected by the RAE.

## **Method**

### ***Participants***

A total of 306 swimming athletes representing 14 states participated in the 2014 Malaysian Schools Sports Council

(MSSM) were evaluated. The participants consisted of 160 male athletes and 146 female athletes from 16 different states and

the participants had been divided into 3 age groups (see Table 1).

**Table 1.** Number of participants who participated in MSSM 2014 according to age.

	<b>Male</b>	<b>Female</b>
Under 12	42	45
Under 15	59	55
Under 18	59	46

### *Procedures*

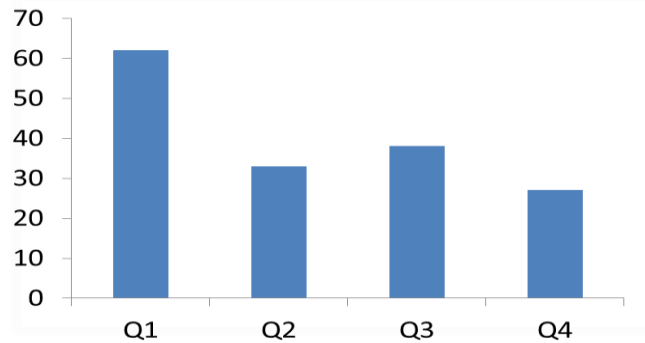
Access to the participants' birth date was obtained from the Sports Division, Ministry of Education and the data was obtained from the technical chairman of the aquatic meet. The cut-off date used for Malaysian age group competitions is 1<sup>st</sup> January. Therefore, the birth dates were categorized into 4 birth quartiles. The four quartiles are: Quartile 1 = January, February, March; Quartile 2 = April, May, Jun; Quartile 3 = July, August, September; Quartile 4 = October, November and December. The athletes who won gold, silver or bronze were considered as medal winners. An athlete who won more than one medal was considered as one and was not repeated in the analyses.

### *Data Analyses*

The main variable was the frequency of athletes born in each quartile of the selection year. In previous studies, the RAE was investigated by looking at a divergence between the expected and observed number of participants born per quartile. Therefore, the athlete's birth date distribution was compared to the birth distribution in the existing population from which this sample was drawn. The data were analyzed using SPSS. A chi-square goodness-of-fit test was used to examine the frequencies of athletes born in each quartile and to determine whether or not the distribution of athlete's birth date was significantly different from the expected distribution (i.e. equal distribution in all quartiles). The significant level of 0.05 was selected to determine statistical significance.

## Results

### *Relative Age Effect in Male Overall Participant*

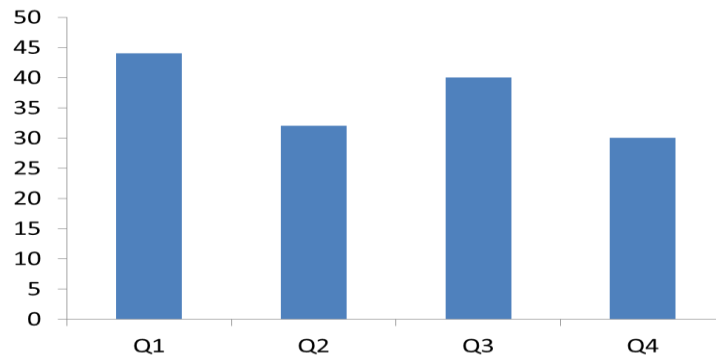


**Figure 1.** Number of Male Participants Overall According to Quartile

According to the Figure 1, there was a significant difference in the birth quartile among all male swimming athletes, Q1(62),

Q2(33), Q3(38), Q4(27) with the difference  $\chi^2(3) = 17.65 ; p = 0.001$ .

### *Relative Age Effect in Female Overall Participant*

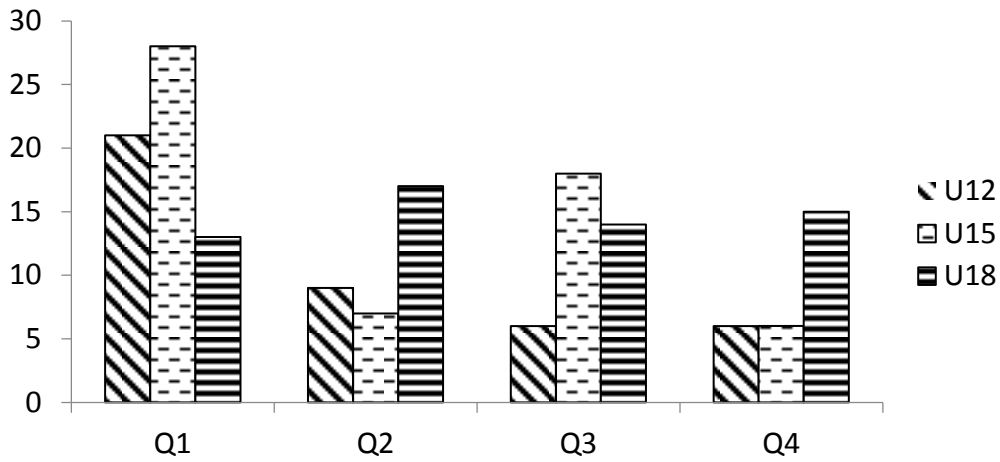


**Figure 2.** Number of Female Participants Overall According to Quartile

Based on the Figure 2, no significant differences were reported between the observed and expected number of female

participants in all quartiles  $\chi^2(3) = 3.59 ; p = 0.31$  among the participants, Q1(44), Q2(32), Q3(40), Q4(30).

**Relative Age Effect in Male Swimmers According to Age Groups**

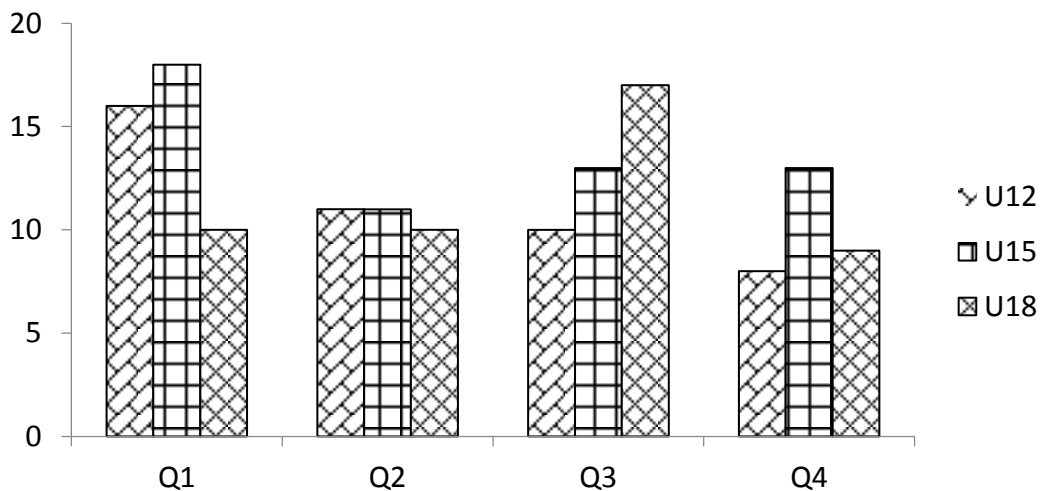


**Figure 3.** Distribution of Male Swimmers' Birth Months of the Various Age Groups

Figure 3 showed there were significant differences in the birth quartile among male swimming athletes in the age of under 12,  $\chi^2(3) = 14.57 ; p = 0.002$ ; Q1(21), Q2(9), Q3(6), Q4(6). There was also a significant difference in the under 15 age group, with

the difference  $\chi^2(3) = 21.88 ; p = 0.001$ , Q1(28), Q2(7), Q3(18), Q4(6) However, no significant RAE was found in the under 18,  $\chi^2(3) = 0.59 ; p = 0.90$ : Q1(13), Q2(7), Q3(14), Q4(15).

**Relative Age Effect in Female Swimmers According to Age Groups**

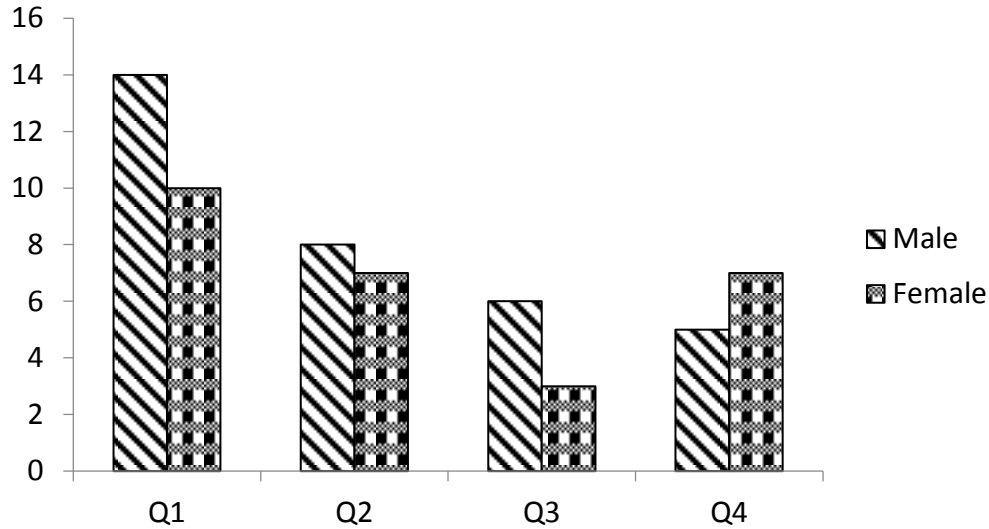


**Figure 4.** Distribution of female swimmers' birth months of the various age groups

As shown above, the number of female participants according to birth quartiles in the U12, Q1(16), Q2(11), Q3(10), Q4(8) revealed no significant differences,  $\chi^2(3) = 3.09$  ;  $p = 0.38$ . The birth months of participants in the U15 age

group, Q1(18), Q2(11), Q3(13), Q4(13) also revealed no significant differences,  $\chi^2(3) = 1.95$  ;  $p = 0.58$ . The same result was reported for the U18 participants as well, Q1(10), Q2(10), Q3(17), Q4(9) ,  $\chi^2(3) = 3.57$  ;  $p = 0.31$ .

**Relative Age Effect in Male and Female Medal Winners**



**Figure 5.** Number of participants who won medals

Figure 5 showed the total number of male swimmer who won medals according to the birth quartiles were Q1(14), Q2(8), Q3(6), Q4(5) revealed that there was no significant differences,  $\chi^2(3) = 5.91$  ;  $p = 0.12$  Same result was reported for the female medal winners, Q1(10), Q2(7), Q3(3), Q4(7),  $\chi^2(3) = 3.67$  ;  $p = 0.30$ .

As a summary, analyses of RAE among the MSSM swimming athletes revealed that there was a significant RAE presence in overall male participants and but not for the female participants. Male participants in the under 12 and under 15 age groups showed a significant RAE but not for the under 18 age groups. Meanwhile, in the female participants, there were no significant RAEs in all age groups (see Figure 4). Further analyses among male medal winners indicated no significant RAE although there were more participants (both

male and female) were born on first quartile of the year (see Figure 5).

**Discussion**

This study was conducted to examine the presence of RAE among male and female swimmers. As reported in previous studies, most of the researchers found there was a significant RAEs among male athletes (e.g., Delorme et al., 2009; Romaneiro et al., 2008; Ryan, 1989). The hypothesis of the male swimmers was partly supported as there was a significant RAE found among the male

swimmers except for the under 18 age group. We suggest that as the swimmers developed through long term training, the technical superiority outweighs the physical advantage. Furthermore, the physical growth and maturity of the swimmers would have even out (e.g., late maturers catching up) at this age group (Malina, Bouchard & Bar-Or, 2004).

The analyses on the female swimmers found no RAE in all the age groups. The hypothesis predicted for the study was supported. The results supported the findings of previous studies (e.g., Delorme et al., 2009). We suggest the reasons could be due to the sport is more popular in males rather than the females as per discussed by the study among the French athletes (Delorme, Boiche & Raspaud, 2009).

As hypothesized earlier, this study supported the finding that the medal winners were not affected by RAE due to the tendency of high skills participants to improve the skills needed during their developmental period (Ford & Williams, 2011).

As a conclusion, the result in the present study showed that RAE was detected among male participants in the age of under 12 and under 15 which the participants were born in the first quartile of the year. Even though RAE was detected in this study, but they were not significantly proven in certain age groups. We suggest the influence of swimming relies more on technical skills rather than physical advantage, which was the likely cause for the absence of the RAE (Ford & Williams, 2011). Further research could examine the data longitudinally by tracking the swimmers from the lower age group until adulthood. Future research could examine other individual sports such as badminton, track and field, tennis and squash.

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