Reviewer’s report

Title: Relationship between age and marathon race time in world single age records from 18 to 80 years

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Reviewer: eric goulet

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Manuscript Revision for BMC Sports Science, Medicine and Rehabilitation
Title: Relationship between age and marathon race time in world single age records from 18 to 80 years

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General comments

This is an interesting and novel research study investigating the relationship between marathon race times and age/sex in 1-year intervals by using the world single age records in marathon running. The article is within the scope of BMC Sports Science, Medicine and Rehabilitation, well-structured and well-written. It demonstrated that marathon race times show a linear progress from 18-35 years and started to increase in a curvilinear manner at the age of ~35 years for both women and men. The sex difference in marathon race time was a U-shaped and was lowest at the age of ~49 years. I only have a few comments/suggestions to improve the quality of the article.

Major Compulsory Revisions

- With the aging of the population, the popularity of running events and the expected rise in the participation of older persons in mass endurance running events there is a clear need to include data for runners of up to the age of 90 years. Please, perform the statistical procedures including the range of age 18 to 90 years.

- It is remarkable that data exists for persons younger than 18 years old, and this for both men and women. Although the lowest age for entering a marathon is 18 years old, it would be extremely informative and educative if you could run a full analysis containing the best running times from the ages of 5 to 90 years old, and this for both men and women. It would be an eye opener for many to learn that young people can run that fast but, most importantly, it would shed some light on the training possibility and adaptations of the human body. So, what I suggest is to perform a first analysis including the age group 18-90 years old and a second analysis including the age-group 5-90 years old. If it is done, please discuss the
fact that below the age of 15 years old men and women seem to perform very similarly. Why above that age men start to run faster needs to be discussed.
- Of the 126 running records, please indicate how many are held by different persons?
- Figures 3, 4 and 5 are not necessary, as they replicate figures 1 and 2.
- For figure 1, add the best fit lines for both the men and women and also add the two regression equations.
- For figure 2, add the best fit line along with the regression equation.
- The Y axis of figure 2 should be titled "Change in performance between men and women".
- For figure 2, if possible, please report the sex difference performance not in % changes but rather in minute changes. The figure would be easier to understand that way.
- An important limitation of your study is that data are cross-sectional. With longitudinal data different results could have been observed. This needs to be stated as a limitation of the study.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests