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Data analysis and graphical representation of 1500-meter male middle distance runners

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Abstract

The fifteen-hundred-meter intermediate distance running events are contested at all worldwide athletics championships including India. The purpose of the study is to investigate the pacing plans of foreign top male athlete and Indian top male athlete in fifteen-hundred intermediate distance race. The study is to display whether divided hundred-meter times of fifteen-hundred meter are different in between foreign top male athlete and Indian top male athlete. Ten male foremost foreign athletes are selected as foreign athletes from readily openly accessible information of the International Association of Athletic Federation (IAAF) World Athletics Championship and Olympics also ten male Indian athletes are selected as Indian athletes from the Association of Indian Universities (AIU) All India Inter University and other Athletics Competition. The study tried to discover intermediate distance running plans of Indian and foreign top athletes.

Keywords: Pacing plans, data investigation, intermediate distance runner, zonal velocity, championship

1. Introduction

The 1500 meters or 1,500-metre run (typically pronounced 'fifteen-hundred meters') is the foremost middle distance track event in athletics. Middle distance running events are track races longer than sprints and shorter than long distance run. A standard middle distance races are 800 meters, 1500 meter, 5000 meters. Pacing strategies for elite performances in middle-distance running events differ slightly among various categories. The shorter middle distance races require a faster start whereas longer middle distance races necessities careful control of the pace (Holt *et al.*, 2014) [4]. The longer the race, the more stamina is needed. The 1500-meters middle distance running events are contested at all global athletics championships including India. All the competitors require to qualify for the final via a series of rounds in a process that usually comprises heats and semi-finals to qualify for final race. The tactical position at intermediate points in qualifying rounds of middle-distance races is a strong determinant of qualification (Renfree *et al.*, 2014) [5]. A vital component for successful running of middle distance running events is the pacing strategy (Hettinga *et al.*, 2017) [3]. Pacing strategies in middle distance running events demands systematic distribution of energy throughout the race. Any runners pacing strategy is dependent on performance goals (Van Biesen *et al.*, 2016) [8]. Usually 1500-meter race requires the speed factor associated with the long sprints and the aerobic capacity of a long distance run (Thompson, 2017) [7]. However, the actual pacing profile observed during such events does not always resemble the pre-planned pacing strategy adopted by the runner or coach. Runners need to take into account the distance remaining until finish and also strategy of opponents (Casado *et al.*, 2020) [1]. Interestingly, every world record from the 1500 meters to the marathon has been set running negative splits (Hanley *et al.*, 2019) [2]. Negative splits running effectively means running the first half of the race slightly slower than the second half. This means that if a runner wants to ensure fastest completion time, then the athlete doesn't run the starting 800 meter too fast.

2. Data Acquisition

Data of the foreign elite athlete was collected from the readily available data in the World Athletics website. A request was made to the President of the World Athletics formerly known as International Association of Athletic Federation (IAAF).

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Accordingly, a formal Data Feed License Agreement was made between the researcher and the World Athletics. As per Data Feed License Agreement, data with respect to the 1500-meter male runners of the IAAF World Championship 2017 organized at the London, United Kingdom from the 3rd to 13th August 2017 was downloaded from the World Athletics website.

Data with respect to Indian athlete, researcher was visited the venue of the 80th Association of Indian Universities (AIU) All India Inter University Athletics (Men & Women) Championship 2019-20 at the Alva's Education Foundation, Moodubidire, Mangalore organized under the Rajiv Gandhi University of Health Sciences, Bangalore, Karnataka, India from the 2nd to 6th January 2020. With due permission of the Organizing Secretary of the championship, four numbers of high definition cameras are placed in each 100 meter of the 400-meter standard track. 4 numbers of markers are also placed inside the running track for accurate footage and timings. Cameras are handled by the researcher and 3 volunteers. Cameras are placed horizontally with front angle at a distance of 5 meter from the outer lane of the 400-meter standard running track. Cameras are placed in the height of 1 meter from ground level. On gun fire from the starter for starting of the 1500-meter male race, researcher and others volunteers on the cameras for video footage and timings.

3. Analysis and results

100-meter split time data of 1500-meter Indian male athletes and foreign elite male athletes are represented in the figure number 1 and 4. Said figure reveals that foreign elite athletes are maintained a constant speed throughout the race of 1500-meter, whereas Indian athletes are unable to maintained the same.

Accordingly mean speed in every 100-meter split time of of both the Indian and foreign and Indian athlete is presented in figure number 2. Graphical representation of mean speed of elite athletes is constant in comparison to Indian athlete.

Comparison of 1500-meter running pace of Indian male athlete and foreign elite athlete are shown in figure number 3 & 5. Study reveals that foreign elite athletes are well planned on their running pace strategies and maintained a constant pace throughout the race. Whereas Indian athletes are unable to planned their pacing strategy in a proper manner and there is an uneven race pace. There is a comprehensive strategic differences in running pace of middle distance runners of Indian and foreign elite athlete.

The results also show an uneven race pace with regard to Indian middle distance runners, and the Indian athletes required more time to complete the race.

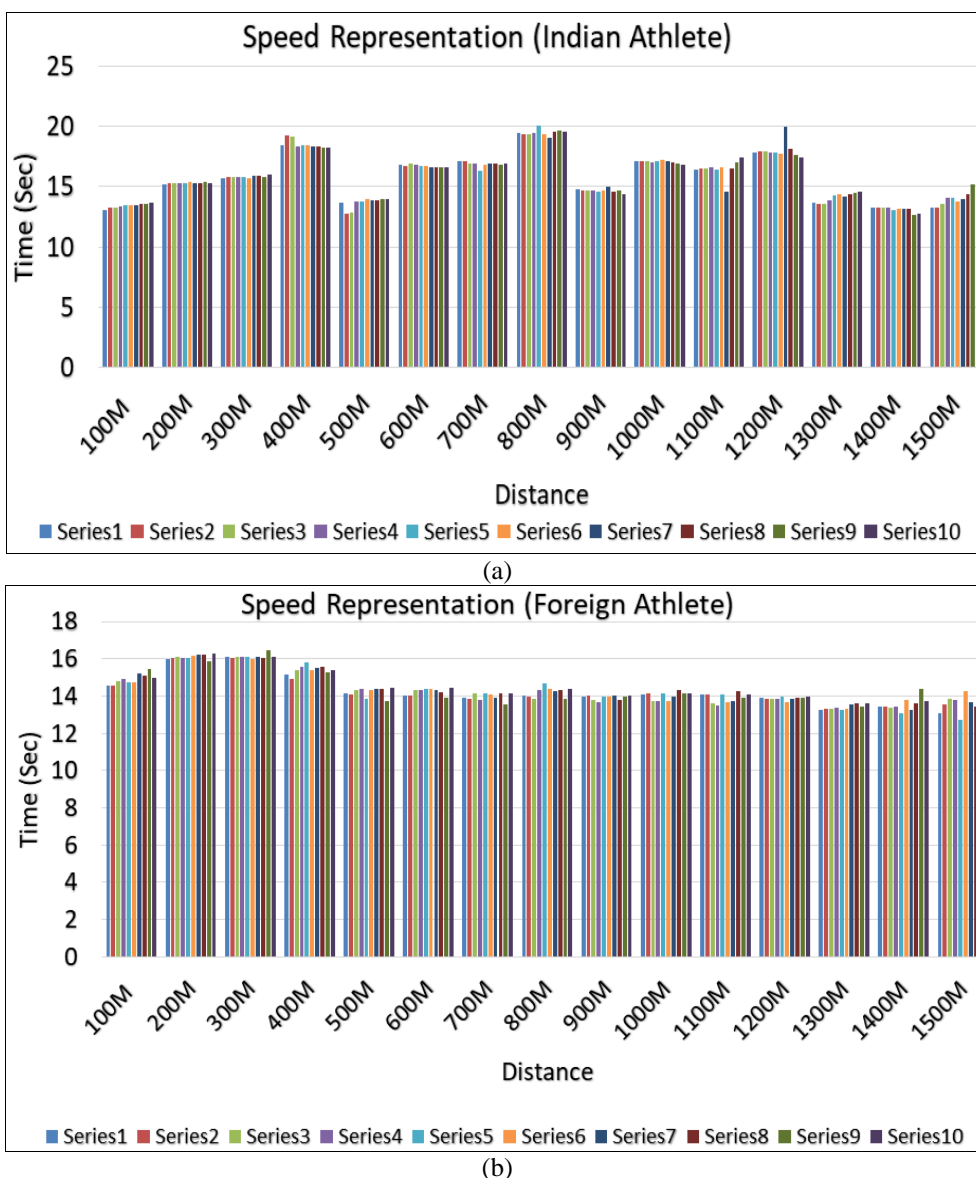
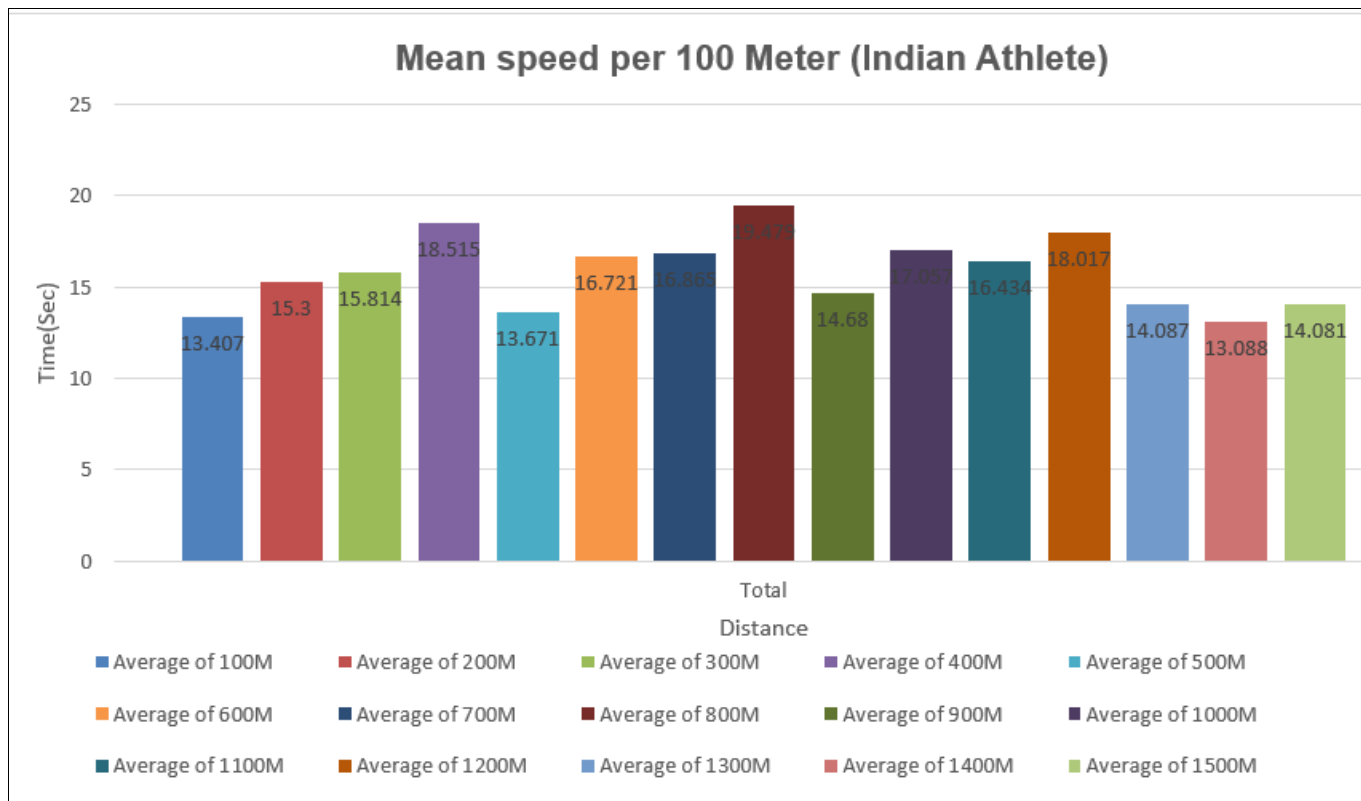
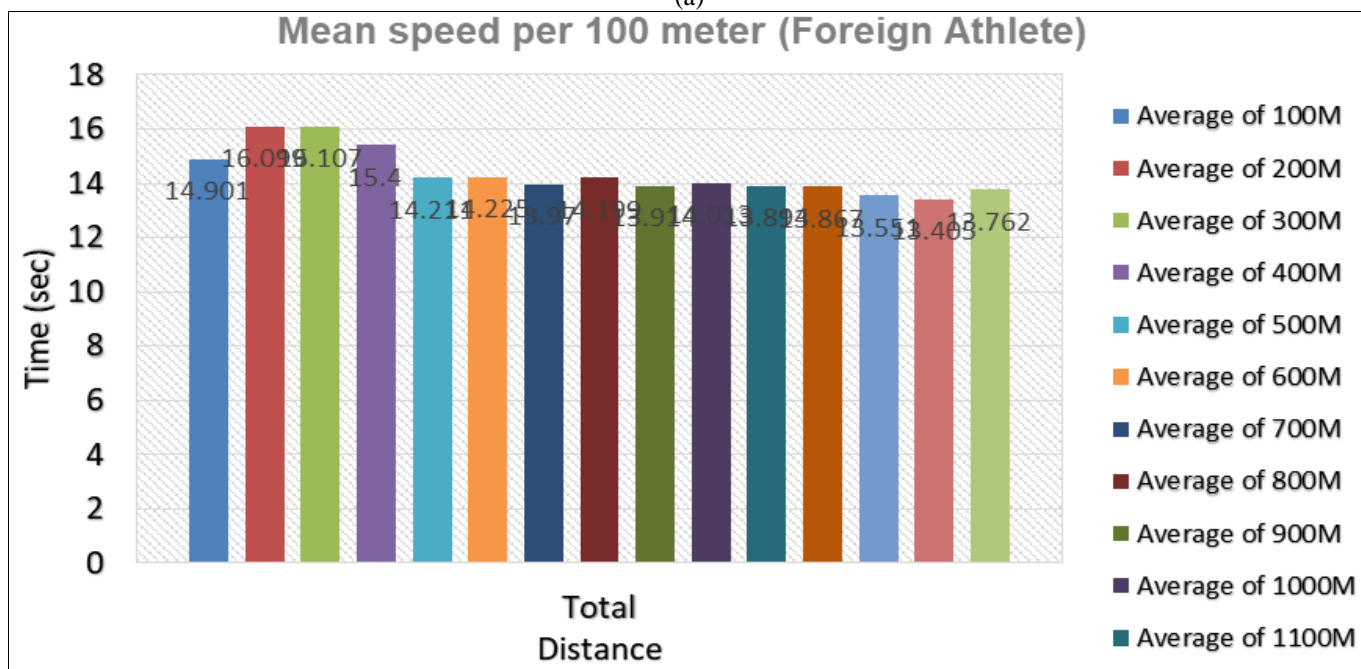


Fig 1: Graphical representation of data of 100 meter split time of 10 numbers of Indian athlete and foreign elite athlete

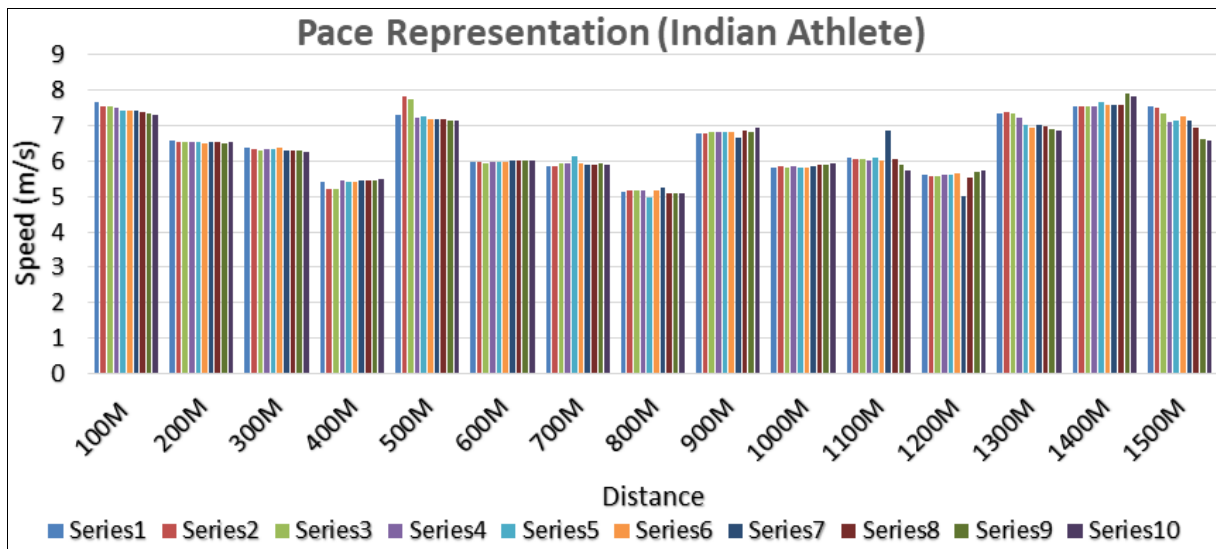


(a)

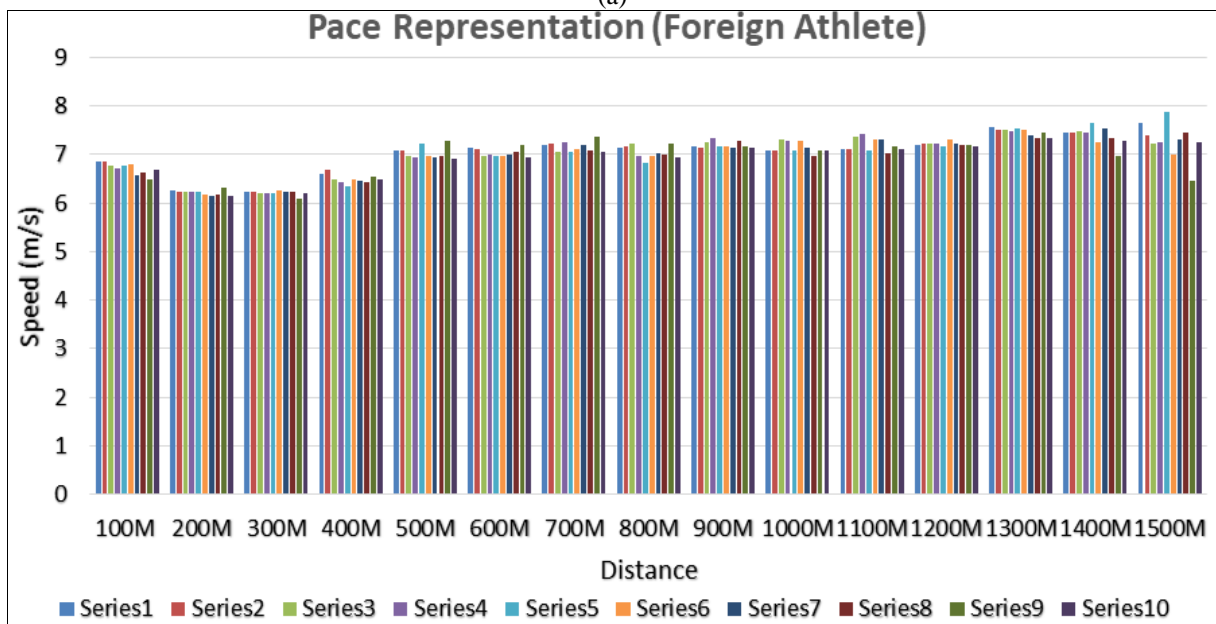


(b)

Fig 2: Graphical representation of mean speed of Indian and foreign elite athlete



(a)



(b)

Fig 3: Graphical representation of running pace of Indian and foreign elite athlete

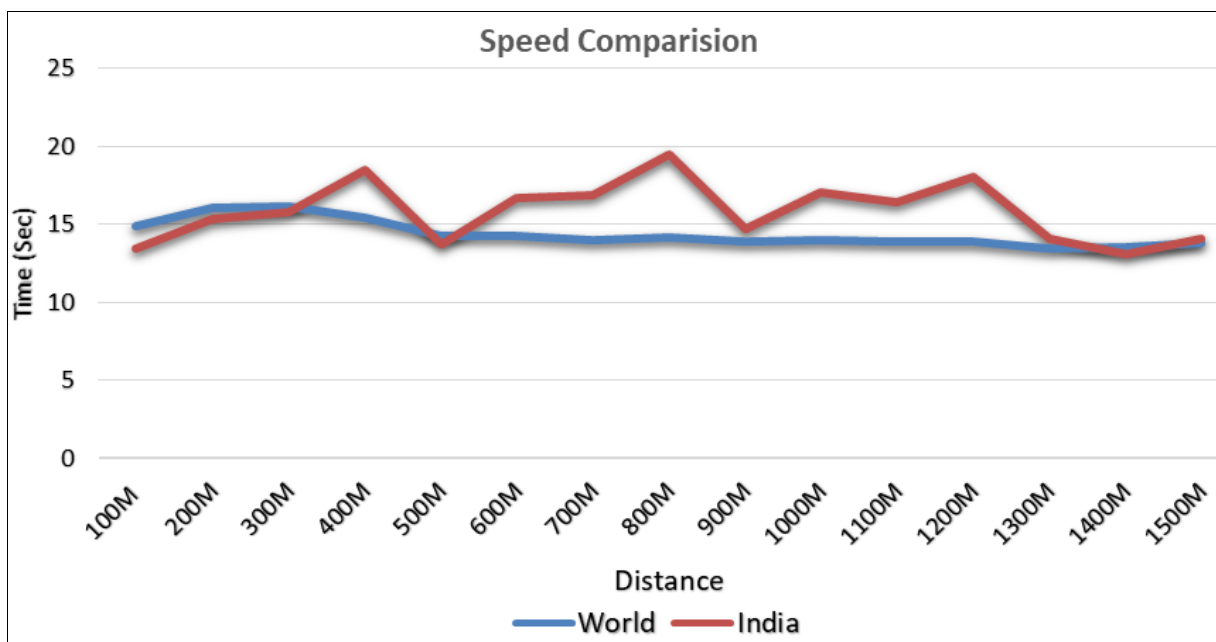


Fig 4: Speed comparison of Indian and foreign elite athlete

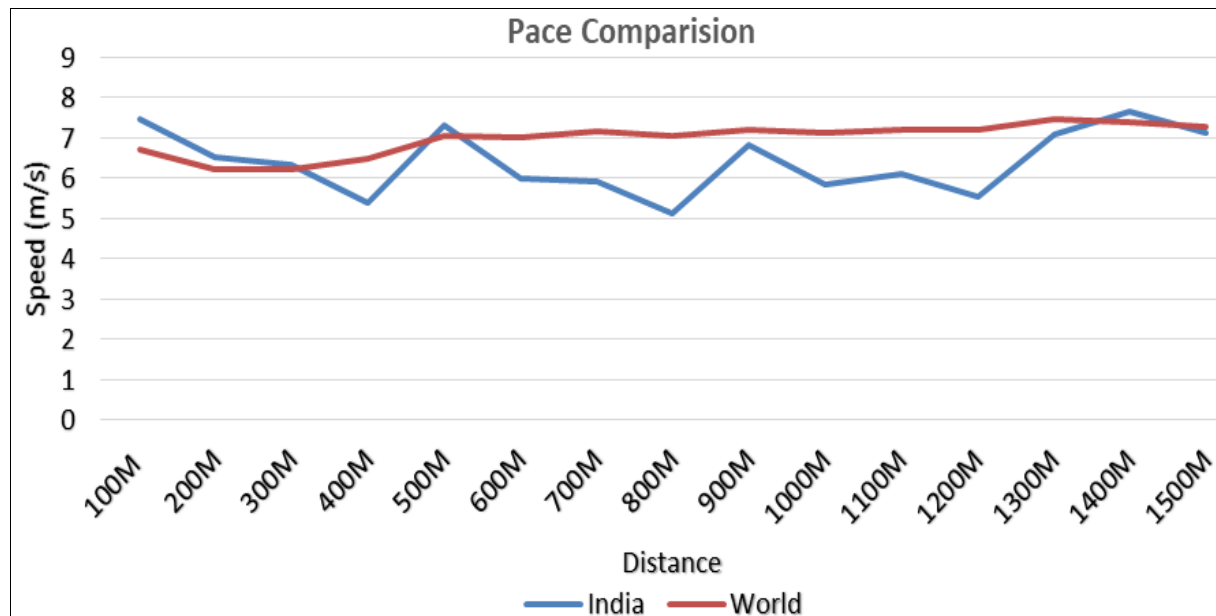


Fig 5: Pace comparison of Indian and foreign elite athlete

4. Conclusion

The article tried to explore middle distance running strategies of Indian and foreign elite athletes. The study reveals that there exists significant difference in the way these athletes pace up their events. On comparing we found that foreign athletes maintain a constant pacing strategy throughout the race (1500-meter). This is found to be in contrast with Indian athletes, who fail to maintain a constant pace throughout the race. Proper distribution of athlete's effort in different segments of the race can save an athlete from undue early fatigue. Gradual increment of race pace after every calculated interval will enable the runners to put their best efforts thereby achieve the best performance.

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