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Development of performance in sprinting events in last 10 summer Olympics

Moupali Mishra and Neptune Ghosh

Abstract
The Olympic Games are considered the world's foremost sports competition with more than 200 nations participating. In athletics and track and field, sprints (or dashes) are races over short distances. There are three sprinting events which are currently held at the Summer Olympics and outdoor World Championships: the 100 meters, 200 meters, and 400 meters. In the present study, the researchers were intended to investigate the performance development in sprinting events in last 10 summer Olympics. For the purpose of study, researchers have considered top 5 performers from the final round of each summer Olympic from the year 1980 to 2016 in 100m, 200m & 400m running events. On these three sprinting events (100m, 200m & 400m), running speed (sec./m) of the top 5 performers have been selected as the variables. Related supportive data were collected from different related websites. From the study, it has been concluded that the development of performance in sprinting events of both male and female is not continuous in last ten Olympics. There were continuous development in sprinting events only from 1980 to 1988 Olympic. In 2000, performance in every sprinting event has fallen down. In 2012, performance in every sprinting event has increased highly. In 2016, performance in every sprinting event has decreased than the previous Olympic except 400m men.

Keywords: Summer Olympic, sprinting event, performance, development

Introduction
The modern Olympic Games or Olympics are leading international sporting events featuring summer and winter sports competitions in which thousands of athletes from around the world participate in a variety of competitions. The Olympic Games are considered the world's foremost sports competition with more than 200 nations participating. The Olympic Games are held every four years, with the Summer and Winter Games alternating by occurring every four years but two years apart. The evolution of the Olympic Movement during the 20th and 21st centuries has resulted in several changes to the Olympic Games. Some of these adjustments include the creation of the Winter Olympic Games for ice and winter sports, the Paralympic Games for athletes with a disability, and the Youth Olympic Games for teenage athletes.
The Olympic Movement consists of international sports federations (IFs), National Olympic Committees (NOCs), and organising committees for each specific Olympic Games. There are several Olympic rituals and symbols, such as the Olympic flag and torch, as well as the opening and closing ceremonies. Over 13,000 athletes compete at the Summer and Winter Olympic Games in 33 different sports and nearly 400 events. The first, second, and third-place finishers in each event receive Olympic medals: gold, silver, and bronze, respectively.
Sprinting is running over a short distance in a limited period of time. It is used in many sports that incorporate running, typically as a way of quickly reaching a target or goal, or avoiding or catching an opponent. In athletics and track and field, sprints (or dashes) are races over short distances. They are among the oldest running competitions. The first 13 editions of the Ancient Olympic Games featured only one event—the stadium race, which was a race from one end of the stadium to the other. There are three sprinting events which are currently held at the Summer Olympics and outdoor World Championships: the 100 meters, 200 meters, and 400 meters.
In the 100 Sprint you will be divided into heats, or groups of six, one person to a lane, and start at the line marked 100 m. The coach will then give two commands, "runners on your mark"

first, and then "Go!" They will either signal the start by waving their arm directly downwards or by firing a blank. For the 200 meter sprint you run in a slightly curved pattern. The same rules apply for start commands as well. The 400 meter is one full lap around the track. Unlike the other two events above, starting for the 400 is staggered. This means that not everyone starts in the same spot. Slower runners start farther ahead, usually in lanes 4-6. The faster runners take the lanes on the inside, closer to the field, in lanes 1-3 and start farther back.

Performance development is a broad term that includes performance management and employee development. It describes both managing/assessing the work that needs to be done and providing opportunities for professional growth and development. In the sports field, it is very familiar term. With the use of latest and advanced instruments, facility, supplement and effective practice schedule, performance is increasing from day to day in every field of sports. For this gradual increment of performance, records are being broken and created every day. Olympic is one of the most popular world championships, which is a greatest platform for the athlete to show their performance. That is why the researchers were intended to investigate the performance development in sprinting events in last 10 summer Olympics.

Significance of the Study

This study may help.

a) To know the development rate of sprinting event
b) To know the present status of performance in respect of previous Olympics
c) To prepare developed training schedule
d) To develop instrument, equipment and facility
e) To develop nutrition chart of the athlete
f) To conduct further studies in this area

Methods

Selection of Subject: For the purpose of this study, researchers have considered top 5 performers from the final round of each summer Olympic from the year 1980 to 2016 in 100m, 200m & 400m running events.

Selection of Variables: On these three sprinting events (100m, 200m & 400m), running timing have been collected through various websites and converted these timing into running speed to describe the development easily. Running speed (meter/Sec.) of the selected subjects have been selected as the variables.

Result and Discussion

Table 1: 100m Sprint performance in Summer Olympic (1980 to 2016) for men.

Sl. No.	Year	Host City	Speed (meter/Sec.)					
			1st	2nd	3rd	4th	5th	Average
1	1980	Moscow	9.76	9.76	9.62	9.60	9.59	9.66
2	1984	Los Angels	10.01	9.81	9.78	9.75	9.74	9.82
3	1988	Seoul	10.08	10.03	10.01	9.96	9.89	9.99
4	1992	Barcelona	10.04	9.98	9.96	9.91	9.90	9.96
5	1996	Atlanta	10.16	10.11	10.10	10.01	10.00	10.08
6	2000	Sydney	10.13	10.01	9.96	9.92	9.91	9.99
7	2004	Athens	10.15	10.14	10.13	10.11	10.06	10.12
8	2008	Beijing	10.32	10.11	10.09	10.07	10.05	10.13
9	2012	London	10.38	10.26	10.21	10.12	10.06	10.21
10	2016	Rio De Janeiro	10.19	10.11	10.09	10.07	10.06	10.11

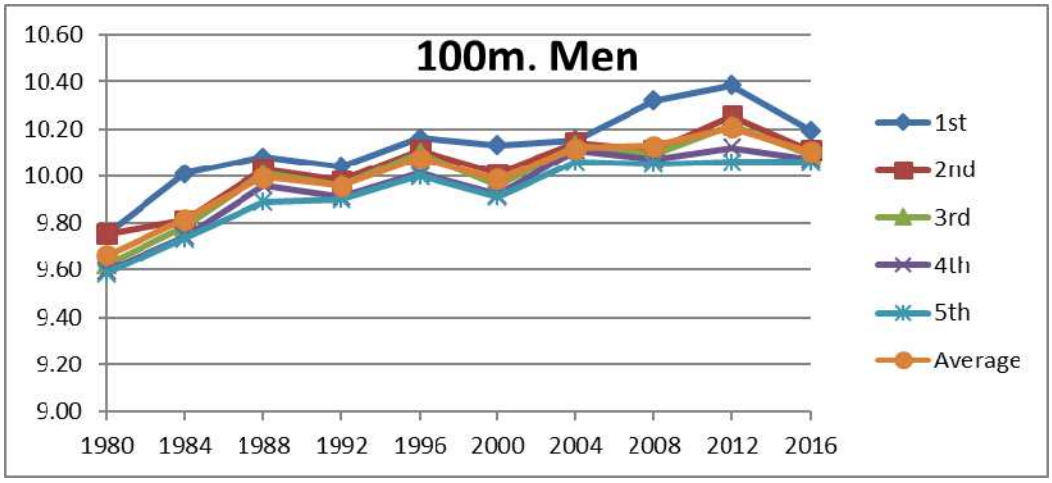

Fig 1: Graphical representation of development of 100m sprint performance for men in Summer Olympic (1980 to 2016)

The above table shows the gradual development of speed in 100m sprinting event in Summer Olympic from the year 1980 to 2016. From this table continuous development of average speed in 100m sprint from the year 7980 to 2012 has been seen except 1992 and 2000. In 2012 highest individual performance (10.38 m/s) was done by 1st position holder (Usain Bolt: 9.63sec.) and made the world record. Average highest speed (10.21 m/s) also can be seen in the same year. That means in 2012 each position holder has done well.

Table 2: 100m Sprint performance in Summer Olympic (1980 to 2016) for women.

Sl. No.	Year	Host City	Speed (meter/Sec.)					
			1st	2nd	3rd	4th	5th	Average
1	1980	Moscow	9.04	9.03	8.98	8.96	8.96	8.99
2	1984	Los Angels	9.27	8.98	8.96	8.89	8.78	8.98
3	1988	Seoul	9.49	9.23	9.22	9.12	9.12	9.23
4	1992	Barcelona	9.24	9.23	9.23	9.22	9.19	9.22
5	1996	Atlanta	9.14	9.14	9.12	9.09	9.04	9.11
6	2000	Sydney	8.99	8.94	8.94	8.93	8.92	8.94
7	2004	Athens	9.15	9.12	9.12	9.09	9.05	9.11
8	2008	Beijing	9.28	9.11	9.11	9.07	9.03	9.12
9	2012	London	9.30	9.28	9.25	9.22	9.18	9.25
10	2016	Rio De Janeiro	9.34	9.23	9.21	9.21	9.17	9.23

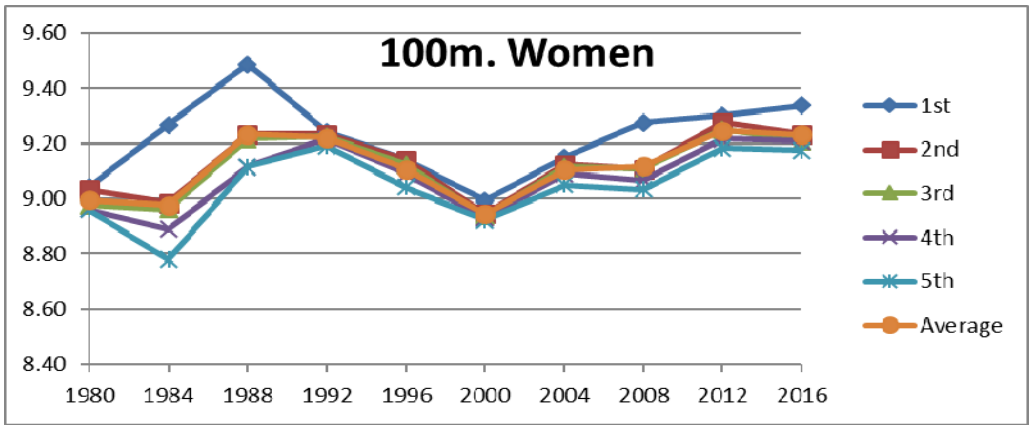

Fig 2: Graphical representation of development of 100m sprint performance for women in Summer Olympic (1980 to 2016)

From the above table it is clear that performances in 100m sprint for women were running up and down from the year 1980 to 1996. From the year 2000 to 2012, a consequential development of performance is shown. In 1988 the 1st position holder (Florence Griffith-Joyner) made the world record for running in pace of 9.49 m/s. In 2012, London Olympic was the best in average performance in 100m sprint for women.

Table 3: 200m Sprint performance in Summer Olympic (1980 to 2016) for men.

Sl. No.	Year	Host City	Speed (meter/Sec.)					
			1st	2nd	3rd	4th	5th	Average
1	1980	Moscow	9.91	9.90	9.86	9.85	9.76	9.85
2	1984	Los Angels	10.10	10.02	9.87	9.85	9.75	9.92
3	1988	Seoul	10.13	10.11	9.98	9.96	9.81	10.00
4	1992	Barcelona	10.00	9.94	9.81	9.78	9.76	9.86
5	1996	Atlanta	10.35	10.16	10.10	9.93	9.92	10.09
6	2000	Sydney	9.96	9.93	9.90	9.90	9.89	9.91
7	2004	Athens	10.11	10.00	9.99	9.93	9.93	9.99
8	2008	Beijing	10.36	10.02	10.01	9.89	9.80	10.02
9	2012	London	10.35	10.29	10.08	10.05	10.00	10.15
10	2016	Rio De Janeiro	10.11	9.99	9.94	9.94	9.94	9.98

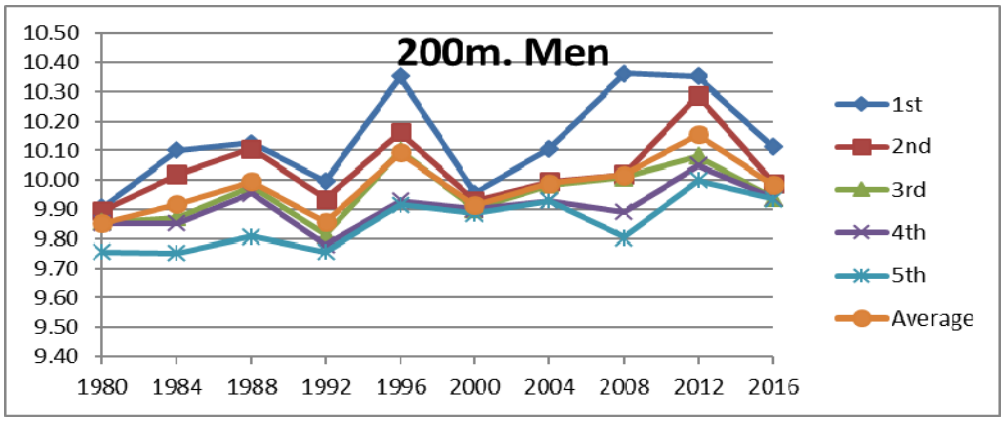

Fig 3: Graphical representation of development of 200m sprint performance for men in Summer Olympic (1980 to 2016)

The above table represents the 200m sprint performance in Summer Olympic for men. Here it is evident that performance was developed continuously in two series; i.e. from 1980 to 1988 and after little turmoil, from 2000 to 2012. The above performance graph looks like a wave because of increase and decrease of performance. In the year 2000 the performances of the all considered sprinters are too close than the other years and it is concentrated in a point in this graph.

Table 4: 200m Sprint performance in Summer Olympic (1980 to 2016) for women.

Sl. No.	Year	Host City	Speed (meter/Sec.)					
			1st	2nd	3rd	4th	5th	Average
1	1980	Moscow	9.08	9.01	9.01	8.90	8.85	8.97
2	1984	Los Angels	9.17	9.07	9.05	9.05	9.01	9.07
3	1988	Seoul	9.37	9.21	9.11	9.10	9.05	9.17
4	1992	Barcelona	9.17	9.08	9.05	9.01	8.97	9.06
5	1996	Atlanta	9.04	8.99	8.94	8.92	8.91	8.96
6	2000	Sydney	8.98	8.98	8.95	8.94	8.92	8.95
7	2004	Athens	9.07	9.02	8.97	8.92	8.79	8.95
8	2008	Beijing	9.20	9.12	9.09	9.09	8.95	9.09
9	2012	London	9.14	9.05	9.03	8.94	8.93	9.02
10	2016	Rio De Janeiro	9.18	9.14	9.03	8.96	8.95	9.05

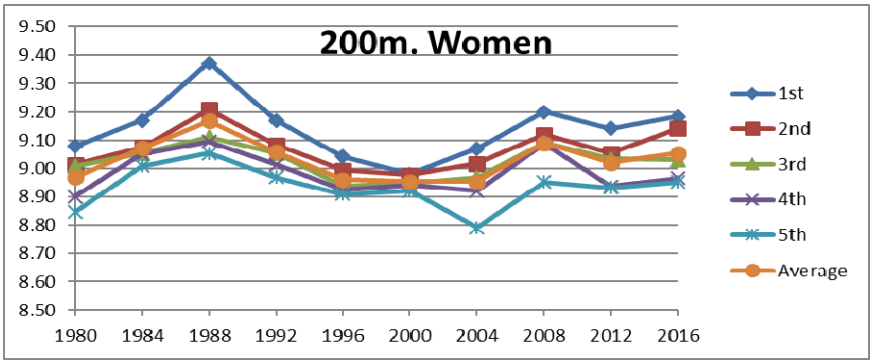

Fig 4: Graphical representation of development of 200m sprint performance for women in Summer Olympic (1980 to 2016)

From the above table and graph it is clear that in case of 200m. Women, performances have been increased quickly and have started to fall down from the year 1992 and finally started recovery from the year 2004. For this gradual decrease and increase, a concave line graph has been formed here. The highest individual as well as average performance is shown in 1988, where lowest performance is shown in 2004.

Table 5: 400m Sprint performance in Summer Olympic (1980 to 2016) for men.

Sl. No.	Year	Host City	Speed (meter/Sec.)					
			1st	2nd	3rd	4th	5th	Average
1	1980	Moscow	8.97	8.92	8.91	8.87	8.87	8.91
2	1984	Los Angels	9.04	8.98	8.95	8.94	8.94	8.97
3	1988	Seoul	9.12	9.11	9.07	8.98	8.94	9.04
4	1992	Barcelona	9.20	9.05	9.04	9.04	8.98	9.06
5	1996	Atlanta	9.20	9.01	8.98	8.96	8.95	9.02
6	2000	Sydney	9.12	9.01	8.95	8.89	8.86	8.97
7	2004	Athens	9.09	9.06	9.00	8.96	8.94	9.01
8	2008	Beijing	9.14	8.94	8.93	8.92	8.87	8.96
9	2012	London	9.10	9.00	8.98	8.93	8.93	8.99
10	2016	Rio De Janeiro	9.30	9.14	9.12	9.09	9.04	9.14

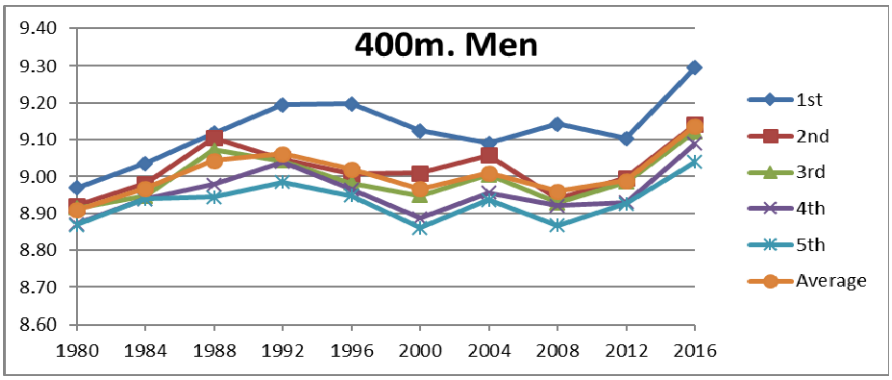

Fig 5: Graphical representation of development of 400m sprint performance for men in Summer Olympic (1980 to 2016)

From the above table it has been shown that how 400m sprint performances for men are being developed in Olympic Games. It is shown that like the previous events, it also has an upward graph up to 1988 or 1992 but after that it formed 'W' shape. This is the only event of which performance increases in Rio Olympic, 2016.

Table 6: 400m Sprint performance in Summer Olympic (1980 to 2016) for women.

Sl. No.	Year	Host City	Speed (meter/Sec.)					
			1st	2nd	3rd	4th	5th	Average
1	1980	Moscow	8.18	8.09	8.05	7.99	7.97	8.06
2	1984	Los Angels	8.19	8.15	8.09	8.01	7.96	8.08
3	1988	Seoul	8.22	8.09	8.02	7.97	7.89	8.04
4	1992	Barcelona	8.19	8.15	8.06	8.05	8.01	8.09
5	1996	Atlanta	8.29	8.23	8.15	8.12	8.07	8.17
6	2000	Sydney	8.14	8.07	8.05	8.03	8.01	8.06
7	2004	Athens	8.09	8.07	8.02	8.00	8.00	8.04
8	2008	Beijing	8.06	8.05	8.01	8.00	7.89	8.00
9	2012	London	8.07	8.05	8.05	8.04	7.98	8.04
10	2016	Rio De Janeiro	8.09	8.08	8.02	7.95	7.93	8.01

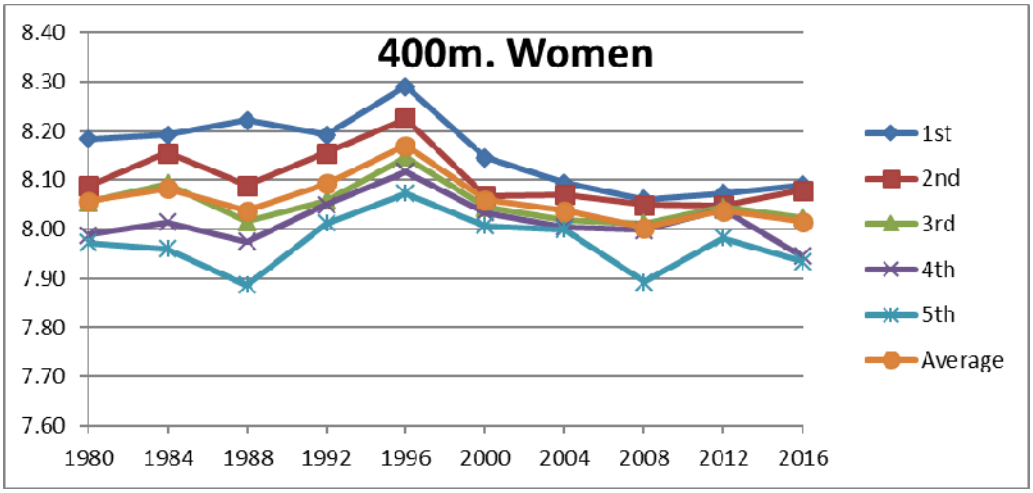

Fig 6: Graphical representation of development of 400m sprint performance for women in Summer Olympic (1980 to 2016)

The above table and graph represent the performance development of 400m sprint for women throughout the last ten Summer Olympic Games. In case of women performance was increased up to Atlanta Olympic, 1996. In that year the individual and average both performances were at peak level and after that year it started to fall down again. In the graph, this increase and decrease of performance gave a shape of Pyramid.

Table 7: Development of Performance in Sprinting Event in Summer Olympics (1980 to 2016)

Sl. No.	Year	Host City	Average Speed (meter/Sec.) of Top 5 Sprinter					
			100m		200m		400m	
			Men	Women	Men	Women	Men	Women
1	1980	Moscow	9.66	8.99	9.85	8.97	8.91	8.06
2	1984	Los Angels	9.82	8.98	9.92	9.07	8.97	8.08
3	1988	Seoul	9.99	9.23	10.00	9.17	9.04	8.04
4	1992	Barcelona	9.96	9.22	9.86	9.06	9.06	8.09
5	1996	Atlanta	10.08	9.11	10.09	8.96	9.02	8.17
6	2000	Sydney	9.99	8.94	9.91	8.95	8.97	8.06
7	2004	Athens	10.12	9.11	9.99	8.95	9.01	8.04
8	2008	Beijing	10.13	9.12	10.02	9.09	8.96	8.00
9	2012	London	10.21	9.25	10.15	9.02	8.99	8.04
10	2016	Rio De Janeiro	10.11	9.23	9.98	9.05	9.14	8.01

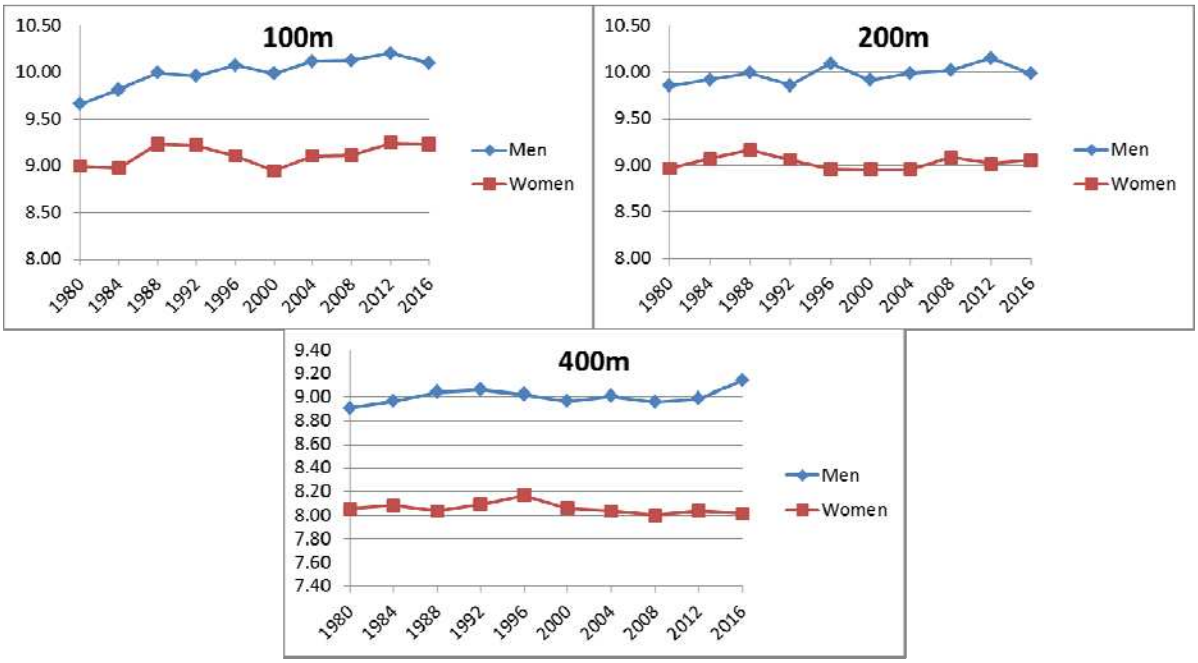

Fig 7: Graphical Representation of Development of Performance in Sprinting Events in Comparison of Men and Women in Summer Olympics (1980 to 2016)

The above table and graphs represent here the development of performance in sprinting events in comparison of men and women event in Summer Olympic from the year 1980 to 2016. From the above graphs the differences between men and women is vividly shown in these three different events. In each event the initial development can be seen from the year 1980 to 1988. In Sydney Olympic, 2016, almost every sprinting event has lower performance. It may be for the environment or other external factors of this country. In the recent Rio Olympic, 2016 every sprinting performance has been fallen down except 400m men. Only 400m for men is the event, in which performance was increased unexpectedly and the 1st position holder (Wayde van Niekerk) has built world record in this year.

In case of men 100m sprint, good performances have been done in the year 1996, 2004, 2008, 2012 & 2016 (above 10 m/s). In case of women, almost every year they have done well (above 9 m/s) except 1980, 1984 & 2000. In 200m men event, it is represented that 1988, 1996, 2008 & 2012 Olympic have crossed the level of 10m/s speed where women have crossed the level of 9 m/s in 1984, 1988, 1992, 2008, 2012 & 2016 Olympic. In case of 400m sprint men event, well performance can be seen in the year 1988, 1992, 1996, 2004 & 2016 where women have performed in a straight line.

Conclusion

On the basis of above results and discussions, the following conclusions may be drawn:

1. The development of performance in sprinting events of both male and female is not continuous in last ten Olympics.
2. There were continuous development in sprinting events only from 1980 to 1988 Olympic.
3. In 2000, performance in every sprinting event has fallen down.
4. In 2012, performance in every sprinting event has increased highly.
5. In 2016, performance in every sprinting event has decreased than the previous Olympic except 400m men.

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