Relationship of Selected Track and Field Tests with Performance of 100 m Female Sprinters

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ABSTRACT

The aim of the study was to find out the relationship of various fitness tests with 100 m run competition performance, to determine the suitable fitness test to assess the performance in l00 m event. The study was conducted on twenty l00m female sprinters who were preparing for various competitions in various Selected training centers. In addition to 100m competition performance, various selected specific fitness tests were conducted on each athlete, by using standard instruments and procedures.

100 m performance is significantly correlated with under distance performance i.e. 30 m flying start, 30 m standing start, and 60 m run ; but a non significant relationship was found with over distance like 150 m, 300 m and 800 m. Standing broad jump, 4 kg overhead backward throw and 10 Boundings variables show a negative but significant relationship with l00 m performance.

The result indicates that an increase in the readings of Standing broad jump, 10 Bounding and 4 kg overhead backward throw will increase the performance of l00 m sprinters; Where as,a decrease in time taken to cover 30 m flying start, 30 m from standing start and 60m will enhance the performance of 100 m runner.

INTRODUCTION

Speed is one of the most important components of physical fitness as well as for the better performance in every field of activity (Hase & Irwin, 1966). Speed plays vital role in all games and sports while it plays a very dominant role in sprint events. For sprinting performance, one must possess reaction ability, movement speed, acceleration ability, locomotors ability and speed endurance apart from other parameters of fitness.

The sprints referred to short and high intensive events which required high anaerobic capacity (Amusa & Toriola, 2003). Indeed, the acquisition of speed is critical for the majority of sports (Cissik, 2002) In the event of track athletics, 100 meter sprinting race was probably the most impressive event in worldwide competition. The praise of being the fastest person in the world could be claimed by world record holder because of the sheer speed of this race.

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Analysis of training of the world's best track athletes indicate that top performances in short distance events is not an outcome of training of one or two years. An intensive training with specific objective over many years is the main aim reason for getting to the top (Schmolinsky, 1978; Arthur, 1981; Bauersfeld, , 1998). Speed is the quickness of movement of limb, whether this is the legs of a runner or arms of the shot putters. Speed is an integral part of every sport and can be expressed as any one of maximum speed, elastic strength (Power) and speed endurance or combination of these three.

Singh et al (2009) conducted study on effect of plyometric drills executed in vertical and horizontal plane on running speed. He concluded that various jumping exercises executed in vertical and horizontal plane, leads to improvement in running speed.

Josen et al (2007) conducted study on 60 boys 11 to 15 years age group to identify the relationship between thigh girth, leg strength^ leg length and flexibility on sprinting performance. It was found that among 11 and 12 years boys, there was positive and significant relationship between sprinting performance and thigh girth ,leg strength and leg length. It was also found that there was no significant correlation between ankle flexibility and sit and reach to sprinting performance. When partial correlations were computed, there was significant correlation between sprinting performance and leg strength. But, in the age group between 14 and 15 years boys, there was significant correlation between sprinting performance and leg length and no significant correlation between thigh girth, leg strength, ankle flexibility and sit and reach. When partial correlation was computed, leg length had significant correlation to sprinting performance. Sprinting performance had no significant relationship with thigh girth, leg strength, ankle flexibility and sit and reach.

Dare et al (1998) suggested below mentioned tests to find out the sprinting ability of the athlete.

- 30m flying start　　To measure speed
- 30m crouch start　　To measure acceleration
- 60m crouch start　　To measure speed endurance (Alactic)
- Standing long jump　To measure leg power

Brady and Maraj (1998) have stated that to run fast, the sprint drills like bounding in horizontal plane, during practice, facilitate to make better sprinters.

Jasmail et al (2013) conducted study on national level 100 m male sprinters. From the results.it was found that 100 meter performance was highly correlated with 30 m and 60 m, 300 m, standing board jump, 10 boundings and 4 kg overhead backward throw variables.

Ceatns (2011) analyzed the performance of world level sprinters of 100 m and found that there is an increase in speed upto 80 m and a slight deterioration during the last 20 meters. The results indicate that better the performance in 20 m, 40 m, 60 m. and 80 m higher the performance on 100 m run.

Babira (2012) conducted study to find out the relationship of leg strength and partial distance performance of 100 meter male sprinters The study was conducted on 50 national level male sprinters and most of them were medal winners in national competition. In her study, she has found that the correlation value of speed tests of 40 m (.310), 60 m (.554) and 80 m (.575) have a significant relationship with 100m performance at the 0.01 and 0.05 level of significance. In her study, she also

mentioned that half squat (.154), 3 hops right (.189),3 hops left (-.047) and three consecutive jumps(.082) have no significant relationshipwith 100m performance. Standing broad jump (.506) was the only strength test which showed highly significant relationship with 100m performance.

There have been many studies that have examined the relationship between horizontal jumping ability and sprinting (Brechue et al, 2010; Kale et al, 2009; McCurdy et al, 2010) .

Rimmer and Sleivert (2000) have found that the sprint specific plyometrics programme appears to have greatest effect over the initial acceleration period (0-10 m), with more modest performance gain noted over the intervals in the 10-40 m range. The sports participants who are accustomed to performing sprints over distances up to 40 m could partially improve sprint speed, particularly in the initial acceleration phase, by adding sprint- specific plyometric exercises to their training.

According to Young (2001) high correlation exists between the below mention events and test distance.

Events	Test Distance
100 m/200 m	10 m, 30 m, 50) m, 250 m.
200 m.400 m	30 m, 100 m, 250 m
400 m/800 m	30 m , 100 m , 250 m

Considering the above mentioned studies, one can conclude that various selected under distance and over distance variables and strength tests are very important for achieving high level of performance in sprinting events.

Therefore, in this study, an attempt was made to find out the relationship of selected track and field variables with the performance of 100 m female sprinters.

METHODOLOGY

The present study was conducted on twenty 100 m female sprinters, who were preparing for various competitions at various SAI, Southern sub training centers.The standard testing procedure were applied to measure selected specific fitness variables like 30 m flying start, 30 m, 60 m, 150 m, 300 m. 800 m . Standing broad jump (SBJ), 4 kg shot over head backward throw (OHBT) . 100 m performance was recorded either during the domestic trial or competitions.

To have a feel for the data, some descriptive statistics like Mean, SD and Standard Error (mean) were computed for the abovesaid variables. They are given in Table 1 and Table 2 .

RESULTS & DISCUSSION

The results presented in Table 2 show significant relationship of 100 m performance with under distance run like 30m flying start (.496*), 30 m run (.475*), 60 run (.515) and strength variables like standing broad jump (-.470*), 4 kg overhead throw (-.501*) and 10 bounds (-.583**). The over distance variables like 150 m (.018), 300 m (.128) and 800 m (.024) show statistically insignificant correlation with 100 m performance. A positive significant correlation of 100 m performance values with 30 m flying start, 30 m run and 60 m run was concluded by Jasmail et al (2013) and Babira (2012).

Ceatns (2011) conducted study on world level sprinters of 100 m and concluded that better the performance in 20 m. 40 m 60 m and 80 m higher the performance on 100 m run. Dare et al (1998) recommended, 30 m flying start, 30 m crouch start, 60 m crouch start to assess 100 m performance. As for as the present study is concerned a non

Table-1: Mean, SD and Std Error (Mean) values of 100 m performance and selected variables

S.No.	Variables	Mean	SD	SE mean
1	100m	12.36	0.61	0.136
2	30m flying	3.81	0.23	0.051
3	30m	4.35	0.19	0.043
4	60m	8.27	0.57	0.129
5	150m	19.74	1.64	0.368
6	300m	47.15	2.52	0.563
7	800m	1.68	27.20	6.081
8	S.B.J	2.23	22.70	5.076
9	4kg OHBTh	7.08	1.55	0.347
10	10 Bounds	21.47	2.39	0.533

Table-2: Correlation Coefficient Among 100m Performance and Selected under distance, over distance variables and strength tests.

Variables	30m Flying	30 m	60 m	150m	300 m	800m	SBJ	4kg OHBT	10 Bounds
100m Run	.496*	.475*	.515*	.018	.128	.024	-.470*	-.501*	-.583**
30m Flying		.503*	.722"	.307	.536*	.248	-.665**	-.716**	-.591**
30 m t			.720"	.469'	.468*	.297	-.549*	-.533*	-.671"
60 m				.380	.403	.021	-.609**	-.725"	-.524*
150 m					.751"	.536*	-.454*	-.190	-.200
300 m						.607"	-.740"	-.385	-.291
800 m							-.376	-.035	-.254
SBJ								.657"	.367
4 kg OHBT									.399
10 Bounds									

** Correlation is significant at the 0.01 level. *Correlation is significant at the 0.05 level.

significant relationship between 100 m performance and over distance performance exists.

On the other hand, a negative and significant correlation of 100 m performance with standing broad jump, 4 kg overhead throw and 10 bounds have been found which means an increase in the value of these strength tests variables leads to decrease in the 100 m timings, i.e. improvement in 100m performance.

Babira (2012) in her study on national level sprinters .found that standing broad jump test is highly correlated with the 100 m performance; where as, the other power tests like half squat (.154), 3 hops right (.189) ,3

hops left (-.047) and three consecutive jumps (.082) have no significant relationship with 100 m performance.

There have been many studies that have examined the relationship between horizontal jumping ability and sprinting (Brechue et al, 2010; Kale et al 2009; McCurdy et al, 2010).

Singh et al (2009) Conducted study on effect of plyometric drills and concluded that various jumping exercises executed in vertical and horizontal plane, leads to improvement in running speed. In another study, Strength tests, namely standing broad jump, 10 boundings and 4 kg overhead backward throw, showed significant relationship with 100 m performance (Jasmail et al, 2013)

CONCLUSION

1 There is a significant relationship of 100 m performance with 30 m flying start. 30 m run, and 60 m run.

2. A negative and significant relationship exists between strength tests i.e. standing broad jump, 4Kg overhead throw and 10 bounds and 100 meter performance.

3. All the over distance variables like 150m. 300m and 800m show statistically insignificant correlation with 100 m performance.

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