



IMPACT OF DIFFERENT LENGTH MEDIATED FATIGUE ON SELECTED PSYCHO-MOTOR COMPONENTS

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ABSTRACT

The purpose of this study was to compare selected psychomotor responses to varying levels (15 minutes, 20 minutes, 25 minutes) of induced physical fatigue among basketball players. 12 basketball players belonging to the age group 18-24 years from Bundelkhand region were selected randomly as subjects. The entire subject was residents of the college and they had the similar routine of diet, work, rest, sleep etc. The necessary data on the selected psychomotor components were collected by administering the test of these variables. The test on hand steadiness, reaction time, speed of movement were conducted in the human performance laboratory, whereas, the testing on orientation ability and balancing ability were conducted on the field. In order to induce the varying level of physical fatigue the subject were made to perform activity on bicycle ergo meter where the load was set by research scholar. Three different level of physical fatigue was induced on the subjects. Score were obtained on each of the selected psychomotor components i.e. after 15 minutes duration of physical fatigue, 20 minutes duration of physical fatigue and 25 minutes duration of physical fatigue. After inducement of one particular level of physical fatigue at a time only one test was administered so that the influence of fatigue could be correctly assessed. Further adequate rest period was provided before administering the next desired level of physical fatigue. The comparative analysis of effect of varying level of physical fatigue of selected psychomotor components of volleyball players were done by one-way analysis of variance (F-ratio). This one-way analysis of variance was applied for each variable separately. The significance of F-ratio, obtain by one-way analysis of variables at 0.05 level of confidence. Where ever F-ratio was found significant LCD post hoc test was employed to test the significant of difference between paired ordered mean. Finding shows that in speed of movement, reaction time and orientation ability significantly differed in 15minutes, 20 minutes, 25 minutes duration of induced physical fatigue. Whereas hand steadiness and balancing ability were showed no significant difference in 15minutes, 20 minutes, 25 minutes duration of induced physical fatigue.

KEYWORDS: physical fatigue , human performance laboratory.

INTRODUCTION :

Physical education and sports are mainly based motor skills the psychomotor components are of great concern to physical activities. The psychomotor is concerned with muscular activities, into those movements of the body, limbs or other body parts necessary for a given action. The psychomotor ability of an individual is an increasingly complex coordination of eye hand and mind. (Singer 1975)

In rigorous sports where physical fatigue is a factor, practice may best be held under condition of physical fatigue which stimulates the actual game condition. Moreover, an athlete must recognize fatigue and accept it as inevitable (for both athlete and opponent) and then learn to ignore it or at least adopt a

callous attitude towards it. A physical output can be maintained long after the initial onset of fatigue symptoms; provide the athlete trains with this end insight. Specific training improves the aerobic power and an increased accumulation of lactic acid in the blood. Training also improves anaerobic capacity there by improving the glycolytic capacity with increased capacity for lactic acid tolerance on the part of the athlete. One who is superior in these qualities then his opponent will certainly perform better. (Slocked 1973)

The purpose of this study was to investigate the effect of induce physical fatigue of different duration on selected psychomotor components of Basketball players. On the basis of related literature and scholar own understanding of the problem it was hypothesized that there will be no significance difference in the psychomotor components to varying levels of induce physical fatigue.

METHODOLOGY

For the purpose of this study 12 male who had represented Bundelkhand region in basketball with age ranged from 18-24 years were selected randomly as subjects. The subjects were thoroughly acquainted with the testing procedure as well as the purpose of the study. For the present study psychomotor variables were selected as speed of movement, hand steadiness, reaction time, balance ability, orientation ability. To measures the speed of movement, Nelson speed of movement test and for hand steadiness of the subjects the test of hand steadiness was used. To measures the reaction time of the subjects the Anand’s reaction time chronoscope was used and for balance ability of the subjects the long nose test was used. And To measure the orientation ability of the subjects numbered medicine ball run test was used. Physical fatigue was induced by bicycle ergo-meter test in which the subject was asked to pedal the ergo-meter continuously (load was fixed by trial). The inducement of physical fatigue and the pulse was noted by intra pulse an instrument as soon as the subject pulse rate reached to the judgment criterion value of 150-170 bpm, they were continued for 15 minutes, 20 minutes, and 25 minutes after every duration of time they were tested on the psychomotor variables of speed of movements, hand steadiness, reaction time, balance ability, orientation ability. To compare the various selected psychomotor abilities one way analysis of variance was used at 0.05 level of significance.

RESULT AND DISCUSSION

Table 1
One-way analyses of variance (speed of movement)

Sources of Variance	Degree of Freedom	Sum of Square	Mean Sum of Square	F-value
Between groups	2	.001	.0005	5.500*
Within groups	33	.003	.00009	

Significant at .05 level, Tab F.05 (2.33)= 3.28

From the above table it is clear that the computed F-value is greater than tabulated F-value so it can be concluded that the evidence is sufficient to indicate a difference in mean speed of movement of three different duration of induced Physical fatigue. To further analyse which induced fatigue is more effective to reduce the speed of movement, pair wise mean comparison analysis was employed by using least significant different (LCD) test it is presented in table 2.

Table 2
Significant Difference between 15 Minute, 20 Minute, 25-Minute Duration of Induced Physical Fatigue of basketball Player (Speed of Movement)

15 Min	20 Min	25 Min	Mean Difference	Critical Difference
1.877	1.938		0.061	
	1.938	2.063	0.125*	.026
1.877		2.063	0.186*	

* Significant difference between mean.

The LCD test result indicates that there was no significant difference between 15 minute duration and 20 minute duration of induced physical fatigue where as mean of the 25 minute duration of induced physical fatigue is significantly higher than 15 minute and 20minute durations of physical fatigue. Thus it may be concluded that 25-minute duration of induced physical fatigue was more effective to reduce the speed of movement of volleyball players.

Table 3
One-Way Analysis of Variance of (Hand Steadiness)

Sources of Variance	Degree of Freedom	Sum of Square	Mean Sum of Square	F-value
Between groups	2	19.34	9.671	
Within groups	33	3495.28	105.918	.091

Significant at .05 level, Tab F.05 (2, 33) = 3.28

From the above table it is clear that the calculated value (.091) is less than tabulated value (3.28) at .05 level of confidence, so that it can be said that there is no significant difference from each other on the component of hand steadiness under varying levels of physical fatigue i.e15 minute, 20 minute, 25 minute duration of induced physical fatigue.

Table 4
One Way Analysis of Variance (Reaction Time)

Sources of Variance	Degree of Freedom	Sum of Square	Mean Sum of Square	F-value
Between groups	2	.024	.012	
Within groups	33	.018	.0005	24.00*

Significant at .05 level, Tab F.05 (2,33) = 3.28

From the above table it is clear that the Computed F-value is greater than tabulated F-value so it can be concluded that the evidence is sufficient to indicate a difference in mean reaction time of three different duration of induced physical fatigue. To further analyse which induced fatigue is more effective to reduce the speed of movement, pair wise mean comparison analysis was employed to using least significant different (LSD) test it is presented in table5.

Table 5
Significant Difference between 15 Minute, 20 Minute, 25minute Duration of Induced Physical Fatigue of basketball Players (Reaction Time)

15 Min	20 Min	25 Min	Mean Difference	Critical Difference
.1700	.2017		0.0317*	
	.2017	.2333	0.0316*	.018
.1700		.2333	0.0633*	

* Significant difference between mean

The LSD test result indicates that there was significant difference between 15minute, 20 minute, 25 minute duration of induced physical fatigue in reaction time because the difference between means of three different duration of induced physical fatigue are higher then critical difference (.018).

Table 6
One Way Analysis of Variance (Balance Ability)

Sources of Variance	Degree of Freedom	Sum of Square	Mean Sum of Square	F-value
Between groups	2	.527	.263	.678
Within groups	33	12.805	.388	

Significant at .05 level, Tab F.05 (2,33) = 3.28

From the above table it is clear that the calculated value (.678) is less then tabulated value (3.28) at .05 level of confidence. So that it can be said that there is no significant difference from each other on the component of balance ability under varying level of physical fatigue i.e. 15 minute, 20 minute, 25 minute duration of induced physical fatigue

Table 7
One Way Analysis of Variance (Orientation Ability)

Sources of Variance	Degree of Freedom	Sum of Square	Mean Sum of Square	F-value
Between groups	2	1.56	0.78	4.33*
Within groups	33	6.05	0.18	

Significant at .05 level, Tab F.05 (2,33) = 3.28

From the above table it is clear that the computed F-value is greater than tabulated F-value so it can be conclude that the evidence is sufficient to indicate a difference in mean orientation ability of three different duration of induced fatigue. To further analysis which induced fatigue is more effective to reduce the orientation ability.

Pair wise means comparison analysis was employed by using least significant different (LSD) test. It is presented in table 8.

Table 8
Significant Difference between 15 Minute, 20 Minute, 25minute, Duration of Induced Physical Fatigue of basketball Players (Orientation Ability)

15 Min	20 Min	25 Min	Mean Difference	Critical Difference
8.07	8.39		0.32	
	8.39	8.58	0.19	0.351
8.07		8.58	0.51*	

* Significant difference between mean

The LSD test results indicates that there was no significant difference between 15 minute duration and 20 minute duration of induced physical fatigue and also 20 minute duration and 25 minute duration of induced physical fatigue. Where as mean of 25-minute duration of induced physical fatigue is significantly higher than 15minute duration of induced physical fatigue in orientation ability. Thus it may be concluded that 25 min duration of induced physical fatigue was more effective to reduce orientation ability of Basketball players.

From the findings it was observed that there was significant differences between 15 minute, 20 minute, 25-minute duration of induced physical fatigue. In case of speed of movement, reaction time and orientation ability probably the reason was speed of movement as the rate of which a person propels parts of his body through space. It depends upon technique, coordination, metabolic power (lactic acid, flexibility, attention and coordination). Reaction time is the ability of an individual to respond to an external stimulus such as the time from the occurrence of a stimulus to the completion of a simple muscular contraction, it depends upon functional capacity of sense organs eg. Eye, ear, etc, coordinative processes of CNS selection and decision making , attention and concentration and anticipation.

Where as orientation ability is the ability to analyse and change position and movement of the body in space and time related to defence action, it depends upon perception, position, movement and the motor action to change the body position and movement of head and eyes is important. On other hand, kinesthetic sense organs assume more important function for orientation.

On the other hand it was observed that there was no significant difference between 15 minute, 20 minute, 25-minute duration of induced physical fatigue in case of hand steadiness, balance ability. Probably the reason hand steadiness is a measure of motor control. It depends upon coordination, flexibility and attention of an individual. Balance ability is the ability to maintain body position, which is necessary, or the successful performance of sports skills. From the above findings result shows that in case of speed of movement, reaction time, orientation ability there were significant differences, therefore, the hypothesis, which was stated earlier, was rejected, however in case of hand steadiness and balance ability did not show any significant difference in this case, the hypothesis was accepted.

CONCLUSION

Based on the finding and within the limitation of the present study this has been concluded that it is sufficient to indicate a difference in mean speed of movement of three different duration of induced physical fatigue. The mean hand steadiness of three different duration of physical fatigue was not significant. From the evidence it is sufficient to indicate a difference in mean reaction time of three different duration of induced physical fatigue. The mean balance ability of three different duration of induced physical fatigue is not significant and from the evidence it is sufficient to indicate a difference in mean orientation ability of three different duration of induced physical fatigue was significant.

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