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A STUDY ON RATE OF PERCEIVED EXERTION STATE DURING EIGHT OVERS BOWLING SPELL IN CRICKET

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Abstract

The purpose of this study was to find out the effect of continuous eight over bowling spell on physical exertion during practice session. Ten (10) male pace bowlers age ranging from 18 to 23 years of Paschim Medinipur West Bengal were selected for this study. Data on selected parameter namely Rate of perceived exertion (RPE) were measured prior to 1st over and immediately after the completion of each 3rd, 5th, and 8th overs, by using Borg scale. The basic statistical parameters were calculated for all the data: the mean, standard deviation and One-way, repeated measures ANOVA were performed to determine differences in the respective 8-over spell. The result shows that the rate of perceived exertion (RPE) increases significantly during the eight over bowling spell but the RPE of the pace bowlers indicated 'very light to fairly light' levels and final RPE represented a rating of 'somewhat hard'. It may be concluded that continue eight over bowling spell has no deleterious effect on metabolic stress and it shows that the bowlers still feel able to continue the bowling spell.

Keywords: Eight Over, Bowling Spell, Physical Sensations, Rate of Perceived Exertion, Cricketers.

INTRODUCTION

In modern cricket, the study of bowling performance and perceived exertion during matches or practice sessions has become an area of interest for research in the now a day. Physical exertions and its symptoms during bowling are varying from individual to individual which can be used as a subjective evaluation of the bowling intensity. Bourdon P, Cardinale M, Murray A, et al. 2017 in a study states that “external and internal bowling workload can be monitored through speed & deliveries bowled and ratings of perceived exertion respectively. In the modern era of sports, numerous methods are applied to monitor a bowler’s physical workload. Recent Researches proved that the Rate of Perceived Exertion (RPE) method is a valid indicator of physical workload. Further, when we talk about the workload monitoring in non-elite pace bowlers in Indian condition, limited literature is available on this topic, in the entire research world, most authors have used elite fast bowlers where a maximum of the results states that bowlers are more injury prone because of the increments of uncontrolled physical workload. Some studies stated that the injuries can be delayed up to three to four weeks after the spike in acute workload (Orchard J, Blanch P, Paoloni J, et al 2015; Hulin BT, Gabbett TJ, Blanch P, et al. 2014; Orchard J, James T and Kountouris A. 2009). Dennis et al. 2005 in a study show that less than three and half days between practice sessions and more than fifty (50) deliveries per day can lead to a higher risk of injury; however, this study did not look at the risk of injury due to decreased workloads. All the studies stated above have work on the fast bowlers at the elite level only within Australia. To date, and to the authors’ knowledge, no studies have looked at the bowling workloads during practice sessions on non-elite pace bowlers and specifically, for this study, within a West Bengal context. It is very much important to identify the intensity during continuous bowling which are the main cause of the risks of musculoskeletal injuries and disorders arising from a mismatch between the bowlers’ capability and the physical demands of their career. Therefore, the purpose of this study was to determine the effect of continuous eight over bowling spell on physical exertion during practice sessions in cricket.

METHODOLOGY

Sample

Ten (10) male pace bowlers 18 to 23 years from Paschim Medinipur West Bengal were selected for this study. At the time of testing all the subjects were bowled without being restricted by injury and all are “match fit”.

Pre-Testing

Prior to the beginning of the experimental protocol subjects standing heights and weights were measured by using stadiometer, weighing machine.

The Rate of perceived exertion (RPE) were measured before the first over with a 15-category scale that was developed by the Swedish psychologist Gunnar Borg.

Experimental Protocol

For the purpose of the experimental protocol after a standardized warm-up, each bowler was bowl 8 overs (six-ball) in a cricket net where two bowlers bowl their six-ball overs like a match situation.

At the completion of each over, one subject would alternately rest and complete fielding drills while the other subject would bowl their over. This alternative process continued until 8 overs will be completed by each subject. The overs were bowled at an average rate of 15 overs per hour, which represent the typical inter University tournament matches conditions.

Data Collection

Data was collected at 30° to 35°C temperature (Humidity 84%) prior to commencement of first over and immediately after the completion of third, fifth and eighth overs the RPE (Rate of Perceived Exertion) were recorded by using Borg scale.

The pace bowlers were instructed to bowl as like match condition by maintain almost same intensity and accuracy.

Data analysis

Data analysis was performed by using the SPSS, version-21. The basic statistical parameters were calculated for all the data: the mean and standard deviation. One-way, repeated measures ANOVA were performed to determine differences in the respective 8-over spell. The level of significance was fixed at 0.05.

The rate of changes was calculated by percentage method.

RESULTS

Mean and standard deviation of General and anthropometric characteristics of the subjects are tabulated and presented in the table 1.

Table 1
Descriptive statistical parameters of General and anthropometric Characteristics of the subjects

Sl. No	Parameters	Mean±SD (N=10)
1	Age (Yrs.)	18.3±0.48
2	Height (CM)	172.4±4.83
3	Weight (KG)	64.1±9.75
4	BMI	21.53±2.75

Mean and standard deviation of selected parameters and Analysis of variance of the subjects in respect of 8-over spell are tabulated and presented in the table 2.

Table 2
Descriptive Statistics and Analysis of Variance of Rate of perceived exertion (RPE) Variable of the Subjects in respect of 8-Over Spell

Parameter	Pre Mean±SD	3 rd Over Mean±SD	5 th Over Mean±SD	8 th Over Mean±SD	F-Ratio
Rate of perceived exertion (RPE) (Points)	9.4 ±0.84	10.7±1.34	11.9±1.10	14±1.70	30.880*

*Significant at 0.05 level $F_{0.05}(3, 27) = 2.95$

The above table-2 indicates that the computed value of F (30.880*) among different overs of bowling from 8-over spell (i.e. Pre-test, after 3rd overs, after 5th overs and after 8th overs of bowling) in relation to RPE was greater than the tabulated F value (2.95), at 0.05 level. Hence, there were significant differences in RPE among the different overs of bowling from 8-over spell. The result of the study indicates that RPE changes significantly among different overs of bowling from 8-over spell.

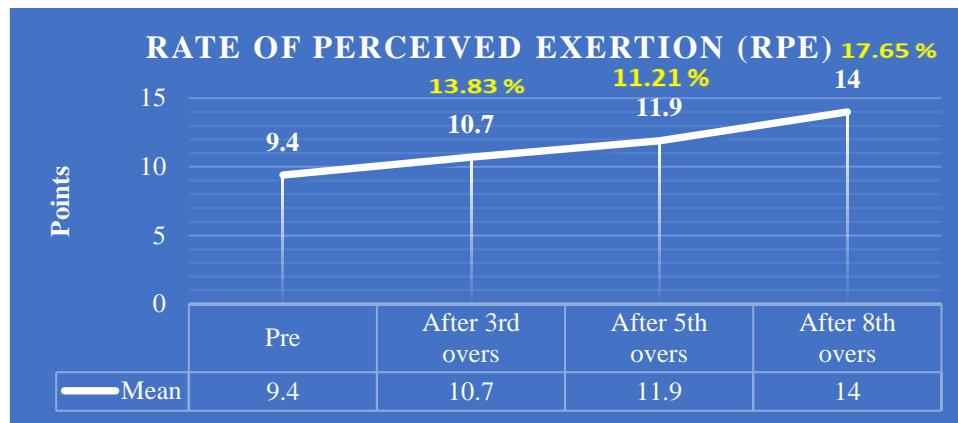


FIGURE -I

GRAPHICAL REPRESENTATION IN MEAN & PERCENTAGE OF RPE OF THE SUBJECTS IN RESPECT OF 8-OVER SPELL

As F-Ratio found to be significant, the data further analyzed with Post-hoc test (LSD test). The results pertaining to this are presented in table-2.1

Table-2.1
Post-hoc test (LSD) comparison of RPE
in respect of 8-over spell

Variable	Treatment	Treatment	Mean Difference	CD
Rate of Perceived Exertion (RPE)	Pre-Test	After 3 Overs	1.3*	0.243
		After 5 Overs	2.5*	
		After 8 Overs	4.6*	
	After 3 Overs	After 5 Overs	1.2*	
		After 8 Overs	3.3*	
		After 5 Overs	2.1*	

*The mean difference is significant at the 0.05 level

The above table reveals that significant difference was found in RPE when compared among Pre-test & After 3rd overs, Pre-test & after 5th overs, Pre-test & after 8th overs and After 3rd overs & after 5th overs, after 3rd overs & 8th overs and After 5th overs & 8th overs of bowling respectively in respect of 8-over spell as the mean difference was higher than the critical difference. The result reveals that the RPE was found to be changeable significantly in respect of 8-overs spell during the pre-test to after 3rd overs, after 5th overs & after 8th overs of bowling respectively.

DISCUSSION:

The present study shows that the rate of perceived exertion (RPE) increases significantly during the eight over bowling spell and the result is corroborated with the findings of Garcin et al. 1998; Garcin and Billat 2001; Nethery 2002; Joseph et al. 2008; Noakes 2004 where the authors stated that the increase in RPE is a linear function of exercise duration suggests that the rate of increase in RPE is set early on in the exercise bout in a feedforward manner. The implication of this linear increase in RPE is that time to fatigue can be predicted within the very first moments of exercise, since it has been found that volitional exercise is terminated at a maximal RPE. Thus, these authors concluded that “psychophysical judgments made early during work were reasonable accurate predictors of exhaustion time” (Crewe, H., Tucker, R., & Noakes, T. D. (2008). According to the original concept of Borg (1982), this linear increase in RPE would indicate that the brain perceives that the exercise is becoming progressively more demanding, even though the work rate remains constant Borg GA.1982; Crewe H, Tucker R, Noakes TD. 2008. The observation that the increase in RPE is a linear function of exercise duration suggests that the rate of increase in RPE is set early on in the exercise bout in a feed forward manner. Further the perceptual markers as inferred via RPE indicated ‘very light to

fairly light' levels and final RPE was represents a rating of 'somewhat hard' this seems to indicate that although there was no metabolic stress and the RPE of the study participants still feel able to continue the bowling spell.

Conclusion

Within the limitation of the study it may be concluded that continue eight over bowling spell has no deleterious effect on metabolic stress and it shows that the bowlers still feel able to continue the bowling spell without impairing the physical exertion.

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