PHYSIOLOGICAL CHARACTERISTICS OF MEN'S DOUBLE BADMINTON PLAYER

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Introduction: Badminton is one of the most popular racquet sports in Indonesia. On the fact that in Barcelona when it's an Olympic in 1992, Indonesia and South Korea has reached two gold medals. In case, this is an improvement that Indonesia was able to compete in sports. For this reason, in the process of defending an achievement, physiological examining must be optimized. Some studies have shown that examining the physiological characteristics of badminton players can become a formula for aid in more appropriate planning and monitoring of specific training. Based on these interests, this study aimed to examine the physiological characteristics of Indonesian Badminton young players and to use the findings to plan training with greater precision.

Methods: 12 male badminton players (Mean ± SD; age= 16.50±0.67 years; height= 175.33±5.93 cm; weight = 69.01±7.55 kg; body fat (kg) = 13.02±3.80; VO_{2max} (ml/kg/min–1) = 49.95±4.45; Muscle mass in humerus dextra (kg) = 3.36±0.43; Muscle mass in humerus sinistra (kg) = 2.89±0.52; Muscle mass in trunk dextra (kg) = 11.98±1.16; Muscle mass in trunk sinistra (kg) = 12.43±1.05; Peak VO_2/HR (ml/bpm) = 17.42±2.48) from Jaya Raya Badminton Club participated in this observational study. Body scan composition, Lactate, Heart Rate, VO_{2max} and other respiratory parameters were measured in the laboratory of National Sports Hospital Jakarta with Dexa Scan Body Fat, Accutrend Plus AU Kit, Transmisor Polar H7 Bluetooth, Cardio Pulmonary Exercise Test Treadmill, Lode-Valiant 2, respectively. This study also measures of Lactate, Heart Rate parameters during match simulations were measured in the Badminton Jaya Raya Stadium Jakarta. The technical assessment during match simulations was developed by members of the training team who have more than 10 years of experience in badminton. The laboratory and match simulations tests were separated by at least 7 days. For statistical analysis, a repeated measures ANOVA was used to evaluate the weight, height, BMI, body fat, VO_{2max}, VE, Rf on each pair of participants. A 2 (condition tests: laboratory and match simulation) × 2 (time: pre, post) repeated measures analysis of variance (ANOVA) were calculated for lactate concentration of all participants. Independent t-test was used to determine any differences HR among the laboratory and match simulation tests. The values are presented as mean ± SD. Statistical significance was accepted at the $p<0.05$ level.

Results: The characteristics of the study sample during match simulations are presented in Table 1. Table 2 shows the weight, height, BMI, body fat, VO_{2max}, VE, Rf on each pair of participants. This study has shown, no significant difference in weight (p=0.83), height (p=0.55), BMI (p=0.76), body fat (p=0.91), VO_{2max} (p=0.82), VE (p=0.26), Rf (p=0.49) was found between each pair of participants. In the lactate measures, there was a significant main effect for group (p=0.001) and time (p=0.001). Additionally, independent t-test also revealed significantly different were observed between pre- to post test in laboratory test (p=0.001) and match simulation test (p=0.007). Furthermore, our statistical analyses revealed significant difference in HR was found between tests (p=0.001).

Table 1. The rally characteristics of the study sample during match simulations

Pair	Lob	Drive	Smash	Drop	Net	Forced Error	Unforced Error	Service
Pair 1	27±11.31	38±8.49	19.5±7.78	25.5±4.95	1.5±0.71	3.5±0.71	6.5±3.54	19±0.1
Pair 2	26±9.90	40.5±0.71	12.5±2.12	24±5.66	3.5±3.54	6.5±0.71	12.5±2.12	15±2.83
Pair 3	30.5±2.12	47±1.41	14.5±0.71	32.5±3.54	2.5±2.12	3.5±0.71	8±7.07	17.5±0.71
Pair 4	32.5±2.12	44.5±0.71	15.5±2.12	33.5±2.12	2±2.83	3±2.83	10.5±7.78	25±9.90
Pair 5	18±9.90	34.5±10.61	12.5±3.54	33±9.90	1±1.41	2.5±0.71	10±2.83	22±4.24
Pair 6	15±2.83	28.5±0.71	9.5±3.54	20±5.66	2±2.83	3.5±0.71	9.5±6.36	18±2.83

Table 2. The differences in weight, height, BMI, body fat, VO_{2max}, VE, Rf measures on each pair of participants

Pair	Weight (kg)	Height (cm)	BMI (kg/m2)	Body fat (kg)	VO_{2max} (ml/kg/min–1)	VE (l/min)	Rf (b/min)
Pair 1	74.5±8.29	174±12.73	24.6±0.8	15.02±3.1	54.18±0.88	136.65±7.57	59.65±2.19
Pair 2	69.94±8.82	180±1.41	21.61±3.09	14.17±7.27	48.04±4.76	126.62±23.44	60.05±9.97
Pair 3	67.5±13.72	174.5±7.78	22.01±2.56	12.42±5.05	50.55±10.96	95.25±23.55	42.1±11.74
Pair 4	67.44±10.97	177±0	21.54±3.49	12.27±2.79	47.56±0.35	111.55±20.15	55±9.48
Pair 5	71.7±3.11	178±0	22.62±0.99	13.92±5.29	50.04±2.74	114.55±1.34	53.4±0.99
Pair 6	62.98±2.14	168.5±0.71	22.16±0.53	10.33±2.52	49.34±3.21	130.65±6.72	76.35±2.76

Discussion: The one phenomenon of this study showed that, HR average and post-test lactate concentration in laboratory test is higher than match simulation test in all badminton players. These results are similar to previous finding. In a study conducted by Rampichini et al, it was found HR_r vs $\dot{V}O_2$ lower in on court than in laboratory test (IIAT testing). To explain the behavior of the results obtained. Manrique et al, indicate that an adrenergic strategy was triggered in reaction to the stress produced by certain characteristics of the test, including speed, precision, and high level of concentration. Furthermore, Cervantes Blasquez et al, explained that somatic stress could have further boosted the adrenergic response. Respect to our results, this phenomenon is possible, because a similar tests stress response in our study may have been caused by the type of activity and induced concurrent sympathetic activation and parasympathetic withdrawal.

Conclusion: We demonstrated that HR monitoring and lactate concentration during laboratory test is higher than match simulation. Additionally, because of the badminton games is intermittent nature, our results suggest that aerobic high-intensity intervals should preferably be used by coaches and athletes to induce the development of an endurance capacity and VO_{2max}.

References:

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