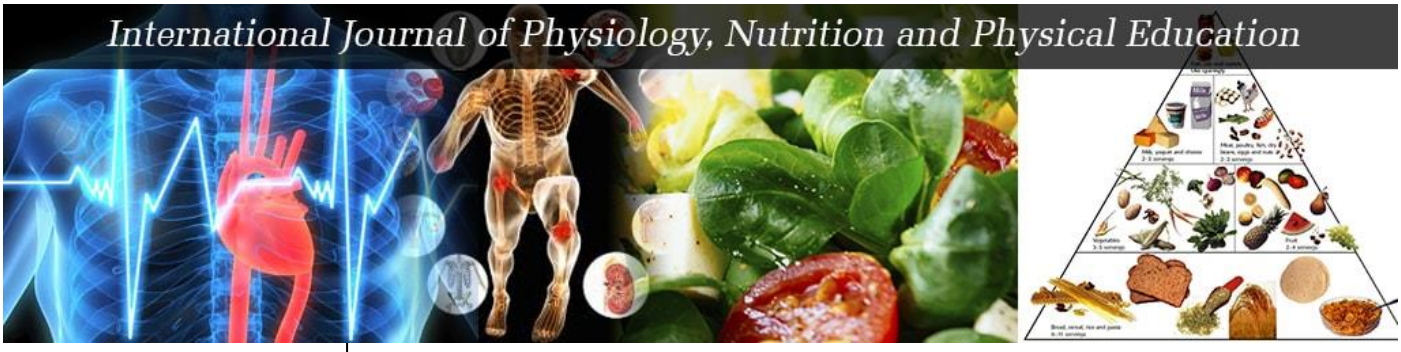

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Effects of yoga on the psycho-physiological components of the adolescent fencers

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Abstract
The aim of the present study is to assess effect of yogic exercises on the psycho-physiological components of the adolescent fencers. Total sixty male fencing players (n=60) belonging to Pune (Maharashtra, India), having age ranged from 14 –18 years were selected randomly. All the subjects were further divided equally into two groups i.e. Group –A and Group B. Pre and post test selected psychological viz. concentration & mood states and physiological variables viz. systolic blood pressure, diastolic blood pressure, pulse rate & vital capacity were evaluated after 8 weeks of yoga exercises and fencing training for group A fencers and only fencing training for group B fencers. Result shows that the training intervention of yoga practices had statistically significant effects on selected psychological and physiological components. Further, yoga practices plays vital role in improving psychological and physiological components of the Fencing players.

Keywords: Concentration, mood states, systolic blood pressure, diastolic blood pressure, pulse rate, vital capacity

Introduction
Competitive fencing is divided into three categories viz., the foil, the sabre and the epee. To achieve success in fencing the training processes depend on developing physical, physiological and psychological aspects. Therefore, the performance in this game is not only dependent on physical abilities but also on physiological and psychological parameters is of prime importance. Previous research has demonstrated the heart rate to be in the range of 167 to 191 beats·min-1 for 60% of the fencing duration during a Women's epee competition (Li *et al*. 1999) [11]. Nevertheless, earlier research studies indicate that yoga practices are helpful to improve physical fitness components and maintain psycho-physiological health. Yogic practices include postures, controlled breathing and meditation which are commonly practiced as mind-body approach. Previous studies demonstrated that yoga exercises improved mood (Berger and Owen 1992 and Berger and Owen 1988) [1, 2]. Additionally, the practice of yoga emphasizes body awareness and involves focusing one's attention on breathing or specific muscles or body parts, and therefore it might be possible that yoga may improve more abilities. Scientific evidence indicates that yoga may be useful for musculoskeletal health, (Garfinkel & Schumacher, 2000) [7] Psychologically, yoga may reduce hostility (Bhushan & Sinha 2001) [3], improve mood (Lavey *et al*., 2005; Netz & Lidor, 2003) [13], and reduce stress (Bower *et al*., 2005; Carlson *et al*., 2004; Gura, 2002; Shapiro *et al*., 2005) [4, 5, 9, 15]. Traditional yoga theory indicates that the effects of yoga are due to its combined impact on the mind and body. Though benefits of yoga practices are evident, however, very few studies in relation to yoga and performance in fencing have been conducted therefore; researcher of present investigation carried this study with aim to assess effect of yoga on psycho-physiological aspects of adolescent fencers.

Materials & methods
Sixty male epee fencing players (n=60) belonging to Pune (Maharashtra, India), having age ranged from 14 –18 years were selected randomly. All the 60 subjects were divided randomly into two groups viz; Group –A (Selected yoga practices plus fencing practices) and Group – B (wait list control with fencing practices only).

The research study was conducted for 8 weeks in three stages i.e. First stage in which baseline data regarding various psychological tests viz. concentration & mood states and physiological tests viz. systolic blood pressure, diastolic blood pressure, pulse rate & vital capacity were recorded for both the groups. Second stage (Training or Treatment) in which both the groups were initially trained for fencing for about 40 min. then only Group A subjects were allowed to practice yogic exercises and each session of yoga practices was concluded with *om* chanting. The duration of each *asana* (posture), *pranayama* (breathing exercise) and *kriyas* (cleansing process) for 8 weeks, and in the last Third stage – III: Post test of psychological and physiological variables were again recorded for both the groups.

Results

Table 1: Central Tendency and Dispersion of the Groups in Physiological & Psychological variables in Adolescent Fencing Players (M & SD)

Variables	Groups			
	Yoga practices plus fencing Group (Experimental Group)		Fencing practice Group (Control Group)	
	Pre-test	Post-test	Pre-test	Post-test
Concentration (Pts.)	76.25 (±4.38)	89.15 (±4.81)	74.27 (±4.15)	76.19 (±3.94)
Mood states (Pts.)	63.24 (±5.92)	73.45 (±5.82)	61.78 (±5.47)	63.47 (±4.95)
Systolic blood pressure (mmHg.)	123.15 (±7.65)	115.25 (±7.31)	124.21 (±7.47)	123.22 (±7.62)
Diastolic blood pressure (mmHg.)	82.32 (±4.85)	81.47 (±4.55)	82.41 (±4.83)	81.32 (±5.23)
Pulse rate (beats/min.)	75.32 (±4.37)	70.21 (±4.45)	75.41 (±4.32)	75.14 (±4.31)
Vital capacity (Lit)	3.59 (±0.21)	4.78 (±0.23)	3.48 (±0.25)	3.72 (±0.31)

The results in Table 1 shows the means and standard deviations of the pre-test performance scores of psychological and physiological variables of the Experimental group and Control group indicates that the pre-test means of both the experimental and Control group in both psychological and physiological variables were more or less similar. However, post-test performance scores of the Experimental group and Control group (Fencing practice & regular physical activities) indicates that the post-test means of both the experimental and control group in all the psychological and physiological variables were different.

Table 2: Result of Analysis of Variance (ANOVA) for Psychological variables of Adolescent Fencing players

Source of Variation	SS	df	MS	F- Value
Psychological Variables (A)	3167.40	1	791.85	26.59**
Groups (B)	653.96	1	653.96	21.96**
Interaction	2999.14	3	333.23	11.19*

* $p<0.05$ ** $p<0.01$

Table 2 shows inferential statistics applied on psychological variables, the result of 2 x 2 x 2 Factorial ANOVA revealed that the revealed that most of the variables got significant changes (F=26.59, $p<0.01$). Further, statistically significant changes are also evident in case of experimental and control groups (F=21.96, $p<0.01$) and even in interaction (F=11.19, $p<0.05$). It seems the training intervention had statistically significant effects on selected psychological components. These changes, therefore, have been discriminated further by using post hoc analysis.

Table 3: Result of Analysis of Variance (ANOVA) for Physiological variables of Adolescent Fencing players

Source of Variation	SS	df	MS	F- Value
Physiological Variables(A)	2229.49	3	743.16	29.87**
Groups (B)	645.63	1	645.63	25.95**
Interaction	2568.86	7	366.98	14.75*

*$p<0.05$ ** $p<0.01$

Table 3 shows inferential statistics applied for data analysis on physiological variables, the result of 2 x 2 x 4 Factorial ANOVA revealed that few of the variables got significant changes (F=29.87, $p<0.01$). Further, statistically significant changes are also evident in case of experimental and control groups (F=25.95, $p<0.01$) and even in interaction (F=14.75, $p<0.05$). It seems the training intervention had statistically significant effects on selected physiological variables. These changes, therefore, have been discriminated further by using post hoc analysis.

Table 3: Scheffe's Post Hoc Test for Difference between Pairs of Ordered Means in Various Physical Fitness Variables of Adolescent Fencing players

Psychological Variables		Pre	Post	Pre
Concentration		**Group B Pre (3)**	**Group A Post (2)**	**Group A Pre (1)**
	Group B Post (4)	0.16	0.35*	0.11
	Group B Pre (3)		0.26*	0.08
	Group A Post (2)		--	0.44**
Mood States				
	Group B Post (4)	0.18	0.23*	0.13
	Group B Pre (3)		0.19	0.14
	Group A Post (2)		--	0.30*
Physiological Variables				
Systolic BP				
	Group B Post (4)	0.14	0.24*	0.16
	Group B Pre (3)		0.19	0.11
	Group A Post (2)		--	0.30*
Diastolic BP				
	Group B Post (4)	0.13	0.10	0.08
	Group B Pre (3)		0.09	0.07
	Group A Post (2)		--	0.15
Pulse rate				
	Group B Post (4)	0.16	0.28*	0.14
	Group B Pre (3)		0.24*	0.12
	Group A Post (2)		--	0.33*
Vital Capacity				
	Group B Post (4)	0.18	0.20*	0.13
	Group B Pre (3)		0.19	0.11
	Group A Post (2)		--	0.26*

*p<0.05 ** p<0.01

Post hoc results shows that control did not show significant change in various psychological viz. concentration & mood states and physiological variables viz. systolic blood pressure, diastolic blood pressure, pulse rate & vital capacity of the adolescent fencing players. Whereas experimental group showed significant improvement in various psychological and physiological variables among the fencing players moreover experimental group showed significant superiority over the control in improving all the psychological and physiological variables of the Fencing players.

Discussion on findings

It has been reported that yoga practices found to be beneficial for enhancement of physical fitness and restoring psycho-physiological health amongst varied population. In fact, Yoga is an Indian philosophy which has been evolved from the soil of this country. Many scientific investigations on yoga have already been done in past, which established that yogic postures has many physiological and psychological benefits (Cowen and Adams, 2005; Schure, Christopher and Christopher, 2008; Gharote, 1976) [6, 14, 8]. The results of this study indicate that inclusion of yoga practices along with fencing practices helped to maintain the blood pressure and pulse rate at a lower level. This indicates that cardiovascular efficiency of the fencing players is enhanced as a result of selected yoga practices. Further, the vital capacity of fencing players was also improved. This in fact, suggests that pranayma practices included in training intervention improved cardio-respiratory fitness of adolescent epee fencing players. Similar finding were evident in earlier study conducted in relation to yoga and cardio-respiratory fitness (Madanmohan *et al*., 2003) [12]. Furthermore, the psychological components such as concentration, mood states and eye hand coordination were improved after inclusion of yoga practices among adolescent epee fencing players.

Conclusion

The results of the present study indicate that the training intervention of yoga practices had statistically significant effects on selected psychological and physiological components of the adolescent fencing players. Yoga practices plays vital role in improving concentration, mood states, systolic blood pressure, diastolic blood pressure, pulse rate & vital capacity of the adolescent fencing players

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