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"The effects of physical exercises in the morning and evening time on some physiological parameters"

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Abstract

The present study aimed to compare the effect of physical exercise in the morning and evening time on some physiological parameters which comprised from renal function test including blood urea nitrogen (BUN), serum creatinine (S.cr), some of serum electrolyte**.** (sodium and potassium) and blood pressure. The study included (20) males students volunteers of the second stage - College of Physical Education - University of Basra (10) students from the morning group and (10) students from the evening group. The results Showed that The Bun and S.cr concentration post-exercise in morning and evening group are significant higher than Pre-exercise in the same time, the Bun., S.cr concentration post-exercise in the evening group are higher than post-exercise in morning group ($p \geq 0.05$). But no significant ($P \geq 0.05$) in Sodium and Potassium . While the SYS and DIS blood Pressure level post-exercise are significant lower than Pre-exercise in the morning and evening group, and found that the SYS and DIS blood Pressure post-exercise in evening group are lower In comparison with post-exercise in morning group ($p \geq 0.05$).

Conclusion: The physical exercise cause significantly higher in Bun and S.cr, the concentration of Bun and S.cr post-exercise in evening time are higher than post-exercise in morning time, no significant was appeared in sodium and potassium levels. Conversely, significantly lower in SYS and DIS blood Pressure post-exercise.While, SYS and DIS blood Pressure post-exercise in evening time are significant lower In comparison with post-exercise in morning time

Keywords: physical exercise, pre-exercise, post-exercise, renal function test, blood Pressure.

Introduction

Exercise is an important function of living systems, it effects many systems in our body, human body adapts to exercise by breathing and by cardiovascular systems such as cardiac output is 20-25 liters during high intensity exercise (1). Some studies proved that regular exercises have a positive effect on all body systems, and prevent formation of health problems (2). Prolonged strenuous physical exercise (PSPE) has a strong influence on human metabolism, (3). as well as many of studies investigated the short-term influence of episodic strenuous physical exercises on some biochemical analyses (4). There are changes in blood parameters in line with the intensity, duration and type of the exercise, may be observed this changes in the blood values during and after an intense exercise because of differences in exercise status of the individual, environmental conditions and nutrition, some researches suggesting positive improvements in the blood biochemistry as a result of acute exercise, while other studies suggesting that the changes by long-duration exercises rather than acute exercises (5)when hematology is analyzed, the effect of acute exercise on hematological levels is seen different, these differences depend on the severity, duration, exercise at different times of day and frequency of exercise as well as physical and physiological conditions of subjects (1). In addition the studies showed that daily changes or diurnal cycle of physiological responses in the body indicates the fact that physiological Responses at rest and during exercise throughout the day will change and body capabilities are subject to diurnal influences (4). the important issues in physical education that attracted the attention of many experts around the world is the role of physical activities on renal function (4) Previous studies have shown that single session of aerobic exercise can lead to changes in the immune system, urine creatinine.(4).

Exercises bring along wide range of positive adaptations such as muscular force, reaction time, neuromuscular coordination, balance, body composition, mitochondrial increase, aerobic-anaerobic capacities (7) .

Materials and method

The sample was selected at random(20) from males students volunteers of the second stage (College of Physical Education) University of Basra, (10) students from the morning group and (10) students from the evening group. The heights, weights, and 5 cc. venous blood samples of subjects were taken before the exercise,

Which lasted one and a half hour. the 5cc. venous blood samples were taken again just after the exercise before drinks water or any fluid in sitting position and injected in gel tubes . Blood sample (for morning exercise), was taken at 09:00 and 10:00 (pre- and post- exercise). Blood sample (for evening exercise) was taken at 14:00 and 15:00 (pre- and post- exercise). Serum was obtained by Centrifugation for (blood urea nitrogen, serum creatinine , sodium and potassium) tests . Blood pressure (systolic and diastolic) was measured from the brachial artery, in the right arm in a sitting position using a standard mercury sphygmomanometer, before the exercise and directly after the exercise.

Statistical analysis:

The researcher used the statistical program (spss) in data processing and extract results, the statistical methods used (ANOVA test, arithmetic mean test, and standard deviation).

Results:

Table1: shows the Mean , standard deviation and The coefficient of variation to age, body weight, height of the subjects in morning group and evening group (N=20).The values were expressed as mean±SD.

NO	variables	Morning Group			Evening Group			P≤0.05
		Mean	SD±	c.v	Mean	SD±	c.v	
1	Height (cm)	176.7	7.846	4.44	178.8	10.358	5.793	NS
2	Body Weight (kg)	66.5	5.911	8.88	67	4.824	7.2	NS
3	Age(year)	21.5	0.849	3.948	22	1.052	4.781	NS

The current studywas showed thevalues of Bun.andS.cr. of the subjects before exercise (pre-exercise) and after exercise (post-exercise). However, the study appeared that the Bun & S.cr concentration post-exercise are significant higher than pre-exercise in the morning and evening group. inaddition, The study found that the Bun, S.cr concentration post-exercise in evening group are higher than post-exercise in morning group (p≥0.05).

(Table 2) : Comprise of Kidney function test (Bun and S.cr) in pre-exercise Samples and post-exercise of morning and evening group. The values were expressed as mean±SD**.**

NO.	Kidney Function test	Morning Group				Evening Group				p≥0.05
		Pre-Exercise		Post-Exercise		Pre-Exercise		Post-Exercise		
		Mean	SD±	Mean	SD±	Mean	SD±	Mean	SD±	
1	BUN	36.3	3.233	39.2 ^{c}	3.583	35.51	4.252	44.34^{a,b}	9.569	2.801
2	S.cr	0.907	0.135	1.197^{c}	0.176	1.027	0.107	1.799^{a,}	0.25	0.175

								[b]		

Moreover, as shown in the (table 3) , the results showed, in spite of present mean differences between groups observed in the values (Sodium and Potassium), but these changes were not significant (P≥0.05).

(Table 3) : Compare the values of Sodium and Potassium in pre-exercise Samples and post-exercise Samplesof morning and evening group.The values were expressed as mean±SD.

NO		Morning Group				Evening Group				p≥0.05
		Pre-Exercise		Post-Exercise		Pre-Exercise		Post-Exercise		
		Mean	SD±	Mean	SD±	Mean	SD±	Mean	SD±	
1	Na	143.3	7.196	139.3	5.313	139.8	4.685	137.5	5.296	NS
2	K+	4.49	0.834	4.51	0.699	4.40	0.801	4.43	0.743	NS

Anyhow, the current results showed, that values of SYS and DIS blood Pressure level post-exercise are significant lower than pre-exercise in the morning and evening group, and found that the SYS and DIS blood Pressure post-exercise in evening group are lower in comparison with post-exercise in morning group (p≥0.05) .

Table 4 : Compare of blood Pressure (SYS. and DIS.) in Pre-exercise Samples and Post-exercise samples of morning and evening group.The values were expressed as mean±SD.

NO	Blood Pru.	Morning Group				Evening Group				p≥0.05
		Pre-Exercise		Post-Exercise		Pre-Exercise		Post-Exercise		
		Mean	SD±	Mean	SD±	Mean	SD±	Mean	SD±	
1	SYS.	133	5.27	120.5[b]	6.433	136	16.193	119.7[a]	33.24	10.88
2	DIS.	88	1.699	83.1[b]	2.842	93.4	6.832	82.5[a]	3.541	4.122

Discussion

The current study showed that there is a significant difference between pre-test and post-test in creatinine excretion among research subjects in the morning and evening times (p≥0.05). Furthermore, the study current found that the increased in excretion of creatinine among investigate subjects of evening times (post-test) is significantly more than the morning time (post-test), this result consistent with (Babaee*et al* 2013) and (Ebrahim, *et al* 2015). But inconsistent with other workers (Mantel

Pierre *et al* 2002) and (Lippi *et al* 2008). Though, ehecreatinine levels increment with heavy exercise. The changes that occur in the serumcreatinine during physical activity. In other word, is different depending on the type of exercise, intensity, duration and type of metabolism. Therefore, (Ebrahim, *et al* 2015), who reported that the main reasons for the increase in serum creatinine in athletes which appeared that are seems due to reduction in renal blood flow and glomerular filtration reduction in intense physical activity.

The research results showed that there is a significant difference between pre-test and post-test of subjects in blood urea nitrogen (Bun) in the morning and in the evening ($p \geq 0.05$). And we found that increased in blood urea nitrogen (Bun) among research subjects of evening times (post-test) is significantly more than the morning time (post-test) , this result consistent with the (Lin *et al* , 2011) and (Li *et al* , 2012). But inconsistent with the research results of (Nahid&, Samaneh , 2013) and (RafatiFard*et al* , 2011). The liver produces urea in the urea cycle as a waste product of the digestion of protein.(Macedo, 2011). Bun is an indication of renal health, increased of Bun probably is physiologic response to the decrease of blood flow of the kidney (as a result of dehydration) and not a sign of renal failure, increased of Bun reveals that protein catabolism becomes the dominant biochemical process in the body of the Athletes, which may have a negative impact on the body energy storage and disorder the process of glomerular filtration rate (Li *et al*., 2012).

It seems that time, intensity and volume of training can have an impact on renal function. The results of some studies suggest that changes in the cellular immune system and urinary system following of physical exercise session between evening group and the morning group, time (morning and evening) and time group interaction showed a significant difference. Ebrahim, *et al* (2015).

The Current research result showed that there is no significant difference between pre-test and post-test in serum sodium concentration among research subjects in the morning and in the evening times ($p \geq 0.05$). This result consistent with the (Bilgehan , 2013).& (Ugwuja, *et a el* , 2014). and inconsistent with the (Pourvaghar and Soori , 2007).and (Noakes , 2002) it seems intensity and exercise duration effect on sodium concentration (Ugwuja, *et al*, 2014).

sodium concentration were not effected by the exercise, the non-significant changes in sodium concentration may be due to the short duration of exercise in our study. (Bilgehan ,2013).

also The Current research result showed that there is no significant difference between pre-test and post-test in serum Potassium concentration among research subjects in the morning and in the evening times ($p \geq 0.05$). the present research consistent with (Pourvaghar and Soori, 2007).& (Ugwuja, *et al* , 2014) and inconsistent with (Barlows*et al*. 1994 & Tanabe *et al* , 1999).

The levels of many minerals show variation depending on the kind of exercise, fitness status of the participants (Bilgehan ,2013). The main reason for non-significant in concentration of serum potassium was type , intensity and duration of exercise (Pourvaghar and Soori, 2007).

The current study showed that there is a significant difference between pre-test and post-test in blood Pressure among research subjects in the morning and evening times ($p \geq 0.05$) .and we found that increased in blood Pressure among research subjects of evening times (post-test) is significantly more than the morning time (post-test), this result consistent with the (Jovenes,2015 & Benjamin , 2011) Moderate intensity physical exercise has been shown to reduce systolic BP for 11 to 12 hours and diastolic BP for 4 to 8 hours post-exercise , this may be due to the increased peripheral vasodilation , hypotension Post exercise as a result of reduced vascular resistance by the autonomic nervous system and regulation of multiple vasodilatory mechanisms (Benjamin, 2011). The research of Benjamin suggests that the timing of Physical exercise also may influence on the BP system. Park et al.concluded that exercise in the evening exhibited a greater reduction in systolic pressure (Park *et al* , 2005), another potential mechanism for the BP response to exercise timing may be the influence of the circadian rhythms throughout the day (Somers *et al*,1991).

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تأثيرات التمارين البدنية في اوقات الصباح والمساء على بعض المعايير الفسلجية

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الخلاصة :
هدفت الدراسة الحالية الى مقارنة تأثير التمارين الرياضية في وقت الصباح والمساء على بعض المعايير الفسيولوجيةوالتي تتألف من اختبار وظيفةالكلى بما في ذلك الكرياتين و اليوريا وبعض معادن الجسم (الصوديوم و البوتاسيوم) و ضغط الدم ، شملت الدراسة (20) طالب من طلاب المرحلة الثانية في كلية التربية البدنية و علوم الرياضة في جامعة البصرة (10) طلاب في مجموعة الصباح و (10) طلاب في مجموعة المساء ، اظهرت النتائج وجود ارتفاع معنوي في تركيز الكرياتين و اليوريا للطلاب المتطوعين بعد ممارسة التمارين مقارنة مع تركيزهما قبل ممارسة التمارين في مجموعتي الصباح و المساء ، ووجد ان تركيز الكرياتين و اليوريا للطلاب المتطوعين بعد ممارسة التمارين في مجموعة المساء اعلى من تركيزهما بعد ممارسة التمارين في مجموعة الصباح ($p\geq0.05$) ، ولا يوجد فرق معنوي في تركيز كل من الصوديوم و البوتاسيوم عند احتمالية ($p\geq0.05$)، كم بينت النتائج وجود انخفاض معنوي في مستوى ضغط الدم الانقباضي و الانبساطي بعد ممارسة التمارين في مجموعتي الصباح و المساء ، و وجد ان هناك انخفاض معنوي في مستوى ضغط الدم الانقباضي و الانبساطي بعد ممارسة التمارين في مجموعتي الصباح والمساء ، ووجد ان ضغط الدم الانقباضي و الانبساطي بعد ممارسة التمارين للطلاب المتطوعين في مجموعة المساء اكثر انخفاضا عنه في مستوى ضغط الدم بعد ممارسة التمارين في مجموعة الصباح ($p\geq0.05$).