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Research Article

ELECTROCARDIOGRAPHICAL ANALYSIS OF WALKING AND RUNNING MALE ATHLETES WITH RESPECT TO CVD, LIFE AND FOOD STYLE

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ABSTRACT

Cardiovascular disease (CVD) is a major health problem among people worldwide. The fasting blood samples, ECG and physical examinations were collected from 50 athletes with walking and running in a play ground area at kumbakonam, Thanjavur, Tamilnadu, India along with questionnaire method. The age ranges from 25 to 65 years male players were considered and their Physical measurements also are examined. The present study represents weight; SGOT, bilirubin and QT/QTC in ECG are significant at 5% due to food and life style. They have awareness to avoid smoking and alcohol habitation to reduce any kinds of heart diseases and risk factors with exercises. Hence they can lead healthy life and live risk free with life success.

INTRODUCTION

Sport's unique and universal power to attract, motivate and inspire makes it a highly effective tool for engaging and empowering individuals, communities and even countries to take action to improve their health. Sport can also be a powerful means of mobilizing more resources in the global fight against diseases. Physical activity and Sport support strategies to improve diet and discourage the use of tobacco, alcohol and drugs. As well, physical activity and Sport help reduce violence, enhance functional capacity, and promote social interaction and integration (World Health Organization, 2003). Exercise has beneficial effects on many cardiac risk factors, including triglycerides, high-density lipoprotein (HDL) cholesterol, blood pressure, insulin sensitivity, and body weight. Exercise and weight loss can reduce low-density lipoprotein (LDL) cholesterol and reduce the decrease in HDL cholesterol produced by low-fat diets (Stefanick ML *et al,* 1998).

Regularly conducted sports activities can have effects on body fat and muscle mass. It has been revealed that exercising regularly decreases the fat rate in body and increases intracellular and extracellular fluids (Fellmann. N *et al,* 1999). The reduction in systolic blood pressure can persist for up to 12 hours. Individuals with mild hypertension could normalize their blood pressure with twice-daily exercise sessions (Thompson PD *et al*, 2001). Cardiovascular disease is regarded as the main indicator of cardiac arrests and the leading cause of mortality (Willoughby. S *et al*, 2002). Cardiovascular diseases are the main causes of mortality and an important public health problem. Sudden cardiac death is a major health problem, and most of the cases occur outside the hospital, without warning signs. The 12-lead ECG has been proposed as a simple test that may enhance the detection of cardiovascular abnormalities (E. Z. Soliman *et al*, 2011; G. Nichol *et al*, 2010)

Electrocardiography (ECG) is a diagnostic tool to detect athletes with increased risk of cardiovascular (CV) disease and SCD (sudden heart rate), but descriptions of methodology are scarce and interpretation has often been left to personal experience. "Abnormal" ECG findings related to training are common in athletes, and a challenge to distinguish from pathological ECG findings (Corrado D *et al*, 2010). Blood pressure (BP) is recorded during screening examinations, and high BP accounts for the highest prevalence of abnormal findings (Sealy DP *et al*, 2010). Electrocardiographic (ECG) signals information is derived from analysis of the information indirectly reflected on the surface ECG. The ECG signal is able to make of basic information for heart disease, indisposed of the autonomic nervous system and stress. The world Health Organization estimates that 17.5 million people died of cardiovascular disease. It is representing 30% of all global deaths. Out of these, 7.6 million were due to coronary artery disease (CAD) (Rocha, S *et al*, 2010). Regular participation in sports is highly encouraged because it improves fitness, reduces cardiovascular morbidity and mortality, exerts a positive psychological influence and plays an important social

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role especially for young people. However, intense physical effort can be harmful in subjects affected by cardiovascular abnormalities, and sudden cardiac death (SCD) during sports activities is sometimes the first and definitive manifestation of an underlying silent cardiovascular disease (Corrado D *et al*, 2003).

Life and food style

Lifestyle changes in nutrition, physical activity and smoking status typically show excellent cost-effectiveness in lowering the burden of disease, especially with respect to obesity, future diabetes and heart disease. However, there is an inherent difficulty in undertaking randomized controlled trials of lifestyle factors. For example, the diet of any individual is related to other lifestyle factors (e.g. smoking, exercise, etc.), and although randomized controlled trials are able to eliminate such bias, they are more difficult to conduct for lifestyle factors than those for pharmacotherapy (Rowell LB, 1986)**.** In many cases of SCD there are prodromal symptoms, clinical, ECG or echocardiography abnormalities, as well as a family history of SCD at a young age (Maron BJ, 2003)**.** Abnormal ECG was associated with male sex, young age, strength sports and large heart dimensions. Structural cardiovascular disorder was rarely responsible for ECG changes in trained athletes. It suggests that the bizarre ECG changes may be a part of "athlete's heart syndrome". However, a small but important subgroup of athletes without evidence of structural heart disease may have particularly abnormal ECG patterns (Pelliccia A and Maron BJ 1995). The pattern of blood flow changes when a person goes from resting to exercising. At rest, the skin and skeletal muscles receive about 20 percent of the cardiac output. During exercise, more blood is sent to the active skeletal muscles, and, as body temperature increases, more blood is sent to the skin. This process is accomplished both by the increase in cardiac output and by the redistribution of blood flow away from areas of low demand, such as the splanchnic organs. This process allows about 80 percent of the cardiac output to go to active skeletal muscles and skin at maximal rates of work (Rowell LB 1986).

The addition of a 12-lead electrocardiogram (ECG) to the screening process enhances the detection of certain cardiovascular abnormalities. The major drawback of the use of ECGs in screening, aside from the expense, is the high frequency of abnormal findings associated with normal physiological adaptations of an athlete's heart to training (Maron BJ, 2003).

It is a well documented fact that physical activity provides many benefits to cardiovascular health such as lowering blood pressure, improving lipid profile, modulating insulin resistance and decreasing overall mortality (R.S. Paffenbarger *et al*, 1993). Structural cardiovascular diseases were rarely responsible for the abnormal ECG patterns in trained athletes. The low prevalence of cardiac disease in our cohort was not completely unexpected given that the majority of the athletes examined in our medical program had previously undergone a screening evaluation and would have been disqualified from competitions had cardiovascular abnormalities been identified (Pelliccia A, Maron BJ 1995). Regular endurance training gives rise to many adaptive changes in the cardiovascular system which include expansion of plasma volume, resting bradycardia, increased vagal tone, reduced sympathetic outflow, inhibited sympathetic baroreflexes, increased stroke volume and enhanced coronary circulation (Gallagher KM *et al*, 1999). The QT interval is an important ECG parameter and the identification of ECGs with long QT syndrome is of clinical importance. Considering the required standards for precision, the measurement of QT interval is subjective (Panicker GK *et al*, 2009).

Aim and objective

To compare the cardiovascular with ECG variables between walking and running male players to outcome the interpretations of clinical, CVD and ECG peaks.

MATERIALS AND METHODS

About 50 male walking and running players were selected from Kumbakonam, Tamilnadu area using questionnaire method and Fasting blood sample collected. It was assured that all participants had without food and drink until at least 12 hours before the measurements. It was also assured that they had no food and drink after 800 meter running test. The ages of who ranged between 25 - 65 years, after the events, physical measurements, such as weight (kilograms), height (centimeters), body mass index (BMI) and ECG were measured. Blood was drawn from the brachial vein in 5 cc disposable (BD) syringe of which 2.5 ml was dispensed in a 5 ml sterile glass test tube containing 3.75 mg of dipotassium salt of Ethylene diamine tetra-acetic acid (EDTA) as an anti-coagulant, for the analysis of different haematological parameters.

Table 1 physical and hematology test of running and walking athletes

S.No	Parameters	Normal values with unit	Mean		50 male players - (25 -65 age group) SD			
			Running Athletes	Walking Athletes	Running Athletes	Walking Athletes	Anova	Significant
1	Blood Pressure (Dia)	(120 mm/hg)	137.60	117.44	12.37	11.83	1.373	0.311
	Blood Pressure (Sys)	(80 mm/hg)	96.44	78.92	10.84	9.273		
2	Height	(cm)	161.08	159.08	4.443	3.390	0.295	0.911
3	Weight	(Kg)	70.16	73.88	6.115	11.949	2.478	0.070
4	Hemoglobin	11.4 to 18.2 gm%	11.58	11.32	1.435	1.345	1.045	0.420
5	TC	4000-10,000 C.mm	7.36	7.58	1.476	1.003	1.165	0.421
6	DC Neutrophils	60-70 %	57.32	59.68	14.46	8.430	0.730	0.69
	DC Lymbocytes	20-25 %	35.48	36.48	8.277	9.202	1.412	0.319
	DC Eosinophils	0-5 %	4.56	4.13	1.60	1.97	0.154	0.090

Foot notes: DC-Differential cell count, TC- Total cell count

The remaining 2.5 ml blood was used for the biochemical analysis, like sugar, lipid profile test, and liver function test analyzed using Micro- 300 semi auto analyzer, Elitech. Standard 11-lead Biomedical- CB 1201 ECG was performed. ECGs were interpreted without knowledge of the clinical history of the athlete. All ECG patterns were evaluated according to commonly adopted clinical criteria (Friedman HH 1971; Sokolow M and Lyon TO 1949; Maron BJ *et al*, 1983).

RESULT

This project concentrates the healthy status and awareness of society. The health status was compared with daily walking and running peoples. The sample was collected from the Questionnaire method. The fasting blood sample were collected from college play ground area out of them life style, transport facilities, education and all modern life on 02.03.16. Those areas were differing from work nature, food style, awareness, physical work, sports activity, education, work nature.

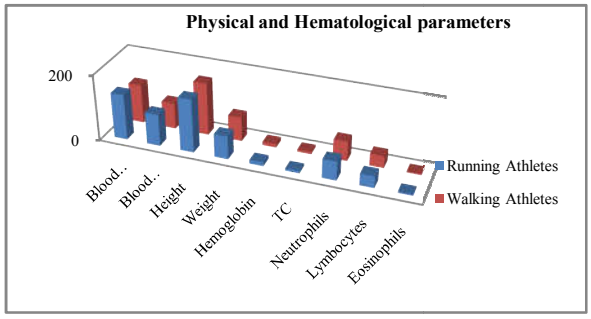

Figure 1 physical and hematology test of running and walking athletes.

Total 50 members were selected with the age group of 25- 65 years. The physical parameters of Weight, blood pressure, hematological and biochemical parameters of total cell count, differential count like neutrophils, lymphocytes, eosinophils, blood sugar, lipid profile like cholesterol, triglycerides, HDL, LDL, VLDL, urea and calcium. The liver function test of creatinine, uric acid, SGOT, SGOT, bilirubin, and ALP are representing in table-1-3 and figure- 1-3.

The running and walking event Mean and SD value of physical parameters like Height, Weight and Blood pressure was examined. The running event pressure Mean and SD values are 96.44/137.60 ± 10.84/12.37 and walking pressure SD values are 78.92/117.44 ± 9.273/ 11.83. The running weight Mean and SD values are 161.08 ± 4.443 and walking Mean and SD values are 159.08 ± 3.390. Even a moderate degree of exercise appears to have a protective effect against CHD and all-cause mortality (Kuipers HS and Keizer HA, 1988). In one study of middle-aged men, participation in moderately vigorous physical activity was associated with a 23% lower risk of death than that associated with a less active lifestyle, and this improvement in survival was equivalent and additive to other lifestyle measures such as smoking cessation, hypertension control, and weight control (Michael ED, 1961). The running and walking people Mean and SD values is 19.88 ± 1.856 and 20.20 ± 2.236. Dietary factors such as a high-calorie, high-fat, and high-cholesterol diet contribute to the development of other risk factors, such as obesity, hyperlipidemia, and diabetes that predispose to CHD. Conversely, a diet that emphasizes fruit and vegetables, as well as one associated with an increased

Table 2 Biochemistry and liver function test of running and walking athletes.

S.No	Parameters	Normal values with unit	50 male players - (25 -65 age group)				Anova	Significant 5%
			Mean		SD			
			Running Athletes	Walking Athletes	Running Athletes	Walking Athletes		
1	Sugar	80-120 mg/dl	122.16	123.20	26.128	34.48	1.416	0.441
2	Cholesterol	170-240mg/dl	194.32	208.72	15.52	35.27	0.524	0.869
3	TGL	80-150mg/dl	144.20	145.36	9.806	17.15	0.877	0.610
4	HDL	30-40mg/dl	53.0	46.08	30.43	5.016	0.372	0.939
5	LDL	Up to 160mg/dl	118.84	134.16	15.997	35.46	0.279	0.955
6	VLDL	Up to 130mg/dl	26.60	28.24	1.936	2.603	1.895	0.133
7	Creatinine	0.7 -1.2 mg/dl	0.73	0.72	0.112	0.111	0.459	0.714
8	Calcium	8.5 to 10.5 mg/dl	10.4	9.12	3.422	1.205	0.429	0.786
9	Urea	10 to 40 mg/dl	19.88	20.20	1.856	2.236	1.639	0.191
10	Bilirubin	0.3 – 1.0 mg/dl	0.87	0.80	0.138	0.134	2.190	0.092
11	SGOT	5 - 35 mg/dl	28.44	27.00	6.727	6.831	8.922	0.000
12	SGPT	5 – 40 mg/dl	26.88	26.96	6.388	6.045	0.885	0.580
13	ALP	65 -170 mg/dl	71.36	69.24	4.829	5.286	0.591	0.818

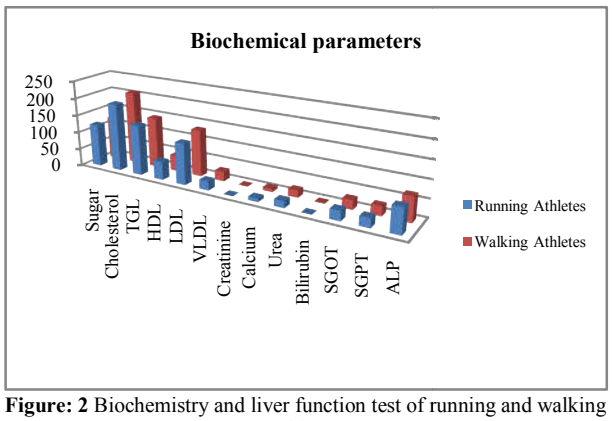

Figure: 2 Biochemistry and liver function test of running and walking athletes

intake of dietary fiber, is associated with a decreased risk of CAD **(**Foster C, 1982**).** The liver function parameters like creatinine, uric acid, SGOT, SGPT, bilirubin, ALP. The running and walking creatinine Mean and SD value is 0.73 ± 0.112 and 0.72 ± 0.111. The running and walking event SGOT values is 28.44 ± 6.727 and 27.00 ± 6.831. The SGPT running and walking SD values are 26.88 ± 6.388 and 26.96 ± 6.045. The jaundice represents bilirubin values are 0.87 ± 0.138 and 0.80 ± 0.134. The ALP running and walking values is 71.36 ± 4.829 and 69.24 ± 5.286. The ECG was examined Heart Rate Mean and SD running and walking values is 78.60 ± 13.58 and 73.68 ± 10.957. The P-AXIS Mean and SD values of running and walking are 54.44 ± 34.01 and 55.72 ± 46.29.

Table 3 ECG values of running and walking athletes.

S.No	Parameters	50 male players - (25 -65 age group)					
		Mean		SD		Anova	Significant (5%)
		Running Athletes	Walking Athletes	Running Athletes	Walking Athletes		
1	Heart Rate	78.60	73.68	13.58	10.957	1.338	0.349
2	P-AXIS	54.44	55.72	34.017	46.29	2.223	0.192
3	QRS-AXIS	48.08	52.44	27.822	15.76	1.340	0.348
4	T-AXIS	21.80	30.19	58.37	38.834	4.075	0.045
5	P-WIDTH	70.27	70.96	32.628	30.012	0.916	0.572
6	P-R INTRAVAL	109.92	114.32	51.557	45.401	1.676	0.208
7	QRS DURATION	108.62	102.00	10.580	21.880	1.334	0.291
8	QT	353.54	355.65	59.21	74.11	6.132	0.002
	QTC	401.46	389.69	7.826	81.72	10.63	0.001
9	RV5	4.81	1.82	16.567	1.377	0.000	0.000
	SV1	0.84	0.62	0.681	2.320	4.090	0.008
10	RV5+SV1	2.18	2.57	1.150	0.676	6.082	0.311

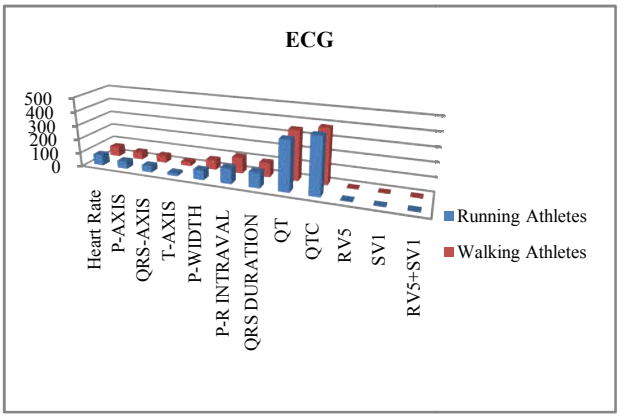

Figure 3 ECG values of running and walking athletes.

Table 4 Normal and abnormal ECG values.

S.No	Parameters	Normal values	Abnormal of ECG
1.	QRS-AXIS , HR	0.06 to 0.1 seconds 30 to 40bpm	Sinus rhythm, Possible left atrial enlargement, low QRS voltage in limb leads
2.	PR INTRAVAL, QRS DURATION	(>0.20 s), 0.06 to 0.1 seconds	Sinus rhythm, Short PR interval, Atrial tachycardia, Short PR interval
3.	QT/QTC, RV5/SV1, RV5+SV1	QTc ≥0.47 sec. for males and ≥0.48 sec. in females) , 25-29mm, RV1+SV5 >10.5mm	Left atrial enlargement coexists with other ECG changes in hypertrophic cardiomyopathy such as T wave inversion, Q waves and ST segment depression.

Documented ECG changes in over trained athletes include T wave changes, ST segments changes, P-R and Q-T time interval changes, and arrhythmias. Various authors have reported enlarged T waves in over trained Athletes (Michael ED, 1961; Foster C *et al*, 1982). The QRS-AXIS Mean and SD running and walking values are 48.08 ± 27.82 and 52.44 ± 15.76. The running and walking event T-AXIS values is 21.80 ± 58.37 and 30.19 ± 38.83. The ECG was examined P-WIDTH Mean and SD running and walking values is 70.27 ± 32.612 and 70.96 ± 30.012. The running and walking event PR-INTRAVAL values is 109.92 ± 51.557 and 114.32 ± 45.40. The QRS DURATION Mean and SD running and walking values are 108.62 ± 10.58 and 102 ± 21.88. The QT/QTC Mean and SD values follow running and walking 353.54/401.46 ± 59.21/7.826 and 355.65/389.69 ± 74.11/81.72. Left trial enlargement coexists with other ECG changes in hypertrophic cardiomyopathy, such as T wave inversion, Q waves, and ST segment depression (N. R. Riding *et al*, 2015) values followed running and walking 4.81/0.84 ± 16.56/0.68 and 1.82/0.62 ± 1.377/2.320. The RV5+SV1 Mean and SD values followed running and walking 2.18 ± 1.150 and 2.57 ± 0.67. Of the 15 athletes with cardiovascular abnormalities and Abnormal ECG also, 20 had abnormal ECGs and 30 had normal ECGs.

The ANOVA values of all parameters were lower except weight, SGOT, Bilirubin and QT/QTC. These parameters were slightly increased of all other parameters. In the present study various parameters are used, among that some values are significant and other values are not significant the significant in 5%. The Individual Questionnaire method was used to collect the information from the selected daily walking and running event peoples in the age group from 25 to 65.

CONCLUSION

The present study suggests that the lead exposed persons having altered lipid profile decreased total cholesterol and LDL level and increased HDL cholesterol. The weight, SGOT, Bilirubin and QT/QTC level is significant at 5%. It suggests that the there is no risk of CVD due to adequate physical activity but walking people had increased value of some parameters than running people, cause lack or inadequate physical activity, food style, life style, smoking and laziness can create risk level but here that peoples have awareness of heath so decreased level CVD. These people must avoid highly fat content food; deep fry food and involving sports activity, meditation, exercise and cycling people can avoid such kind of risk and maintain a healthy life. “Prevention is better than cure” according to this the society can adopt good life style and prefect themselves from various diseases (N. Babu, *et al*, 2015).

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