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FULL LENGTH ARTICLE

The Effects of Aerobic exercise on Insulin and Serum Glucose concentration of middle aged male smokers and non-smokers in Bushehr

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ABSTRACT

The effects of aerobic exercise on insulin & glucose serum of middle aged male smokers & non-smokers in Bushehr. the goal of this research is comparing & surveying the effects of 6-weeks aerobic exercise insulin & fast blood sugar [FBS] of middle-aged male smokers & non-smokers in during the 6-weeks aerobic exercise [intermittent running] for 2 days in a week.The method of surveying: 28 subjects [32-48] are selected among municipal official in Bushehr. Smokers said to the persons who smoke 5 years or more & smoke 7-20 cigarettes in each day & then measured their weight, height & insulin & blood glucose indexes. For analyzing the obtained data of pre-test & post-test was used dependent t-test & for determining the differences among groups were used independent t-test & the maximum significant level was determined 0.05.the results showed that the effects of aerobic exercises on insulin & glycogens have significant differences among pre-test to post-test in smokers & non-smokers [$P \leq 0.05$]aerobic exercising [intermittent running] caused to improvement the serum insulin & glycogen of blood indexes in smokers & non-smokers & also there are not significant differences among these two groups in insulin & fasting blood glycogen but also there is better among smoking persons.

Stop smoking is the best solution for minimizing diseases caused by smoking but since not they cannot success to stop it

Keywords: aerobic exercise, cigarette, insulin, fasting blood sugar

INTRODUCTION

Smoking is one of the most common reasons of providing death in society; smoking caused to increase the catecholamines& then increased the glycogen & plasma insulin. Chronic consumption of cigarette will increase the moderate of glycogen & the experimental findings showed that smoking caused to tolerance against insulin [15]. Also decrease the weight but it is a reason of central obesity that is the important reasons hyperglycemia & dyslipidemia & also caused to increased the inflammation & oxidative stress & directly damage to beta-cell function & endothelial dysfunction all of these cases play role in implicated in insulin resistance & diabetes risks strongly [7] have regular sport activities, increased the metabolism rate transmission of glucose in body & caused to cell sensitivity improvement to insulin injection [18] & there is two mechanism cells during exercise to decrease the amount of insulin secretion, first, decreasing MRNA per insulin showed the decreased insulin synthesis in the live, second since the existing the glycokinase in liver are necessary to sensitivity of pancreatic beta-cells insulin, so decreased of MRNA glucokinase caused to decrease the sensitivity of cells to insulin & then the secretion will be decreased [20]. There is some significant documents that show that aerobic activities caused to increase answering to insulin in normal person & persons with tolerance different glucose. Aerobic sports are activities that a large of muscles exercise with low & moderate intensity as continuous interval, jogging, cycling & swimming are samples of these kinds of sports. Rashidlamir et al [2012] studied on 30 middle-aged healthy men [age=4.77+/-38.56. BMI s.16 +/-25.14] during 8 weeks & in each weeks 4 sessions with 60-80 percents intensity of beat hearts that the results showed that the insulin plasma & glucose of blood levels increased meaningfully [17]

Carrek et al announced that 9 months physical activities which based on physical activities among normal weight children develops sensitivity to insulin [3] also there is some researches that the effects of exercise will remain in-conclusion in insulin & glucose development such as Bijeh et al [2011] declined that aerobic exercise with 60-70 percents saving beat hearts intensity [HRR] don't make any significant decreased in the level of plasma insulin among slim women [37-47 years old] [1] & Gray reported that increasing the physical activity among men about 300 steps in each day [about 30 minutes for walking] don't have meaningful effects in insulin level [3] since the prevalence of diabetes among men & women of Bushehr is reported 10,3 & 12.9 percent [20] & diabetes are closer relationship with using cigarette & it is necessary to find methods for reducing the side effects of smoking on insulin resistance since the surveying showed that there was low researches about the precautionary role of sport on insulin resistance in healthy smokers in Iran & world & most of researches are done on persons who have diabetes & smokers & other distinction of these two researches are on subjects who smoking & current research insisted on precautionary role of sport on insulin resistance & because of it subjects are selected among healthy persons & said that aerobic training program [6 weeks] surveyed on plasma insulin & glucose among smokers & non-smokers that don't have any sport experiences & physical activates to first, identify the effects of aerobic sport on listed variables, second know about the different of aerobic sport effects on these variables among smokers & non-smokers in other words, specifying whether 6-week aerobic exercise effects on variables development higher in smokers or in non-smokers.

METHODOLOGY

Samples

The data is collected by questionnaire & qualitative measurement. Questionnaire creates information, such as; experience, damage & harm disease, the number of cigarette, the experience of using cigarette & the personal characteristics. For doing these 28 subjects are selected that they were in mean 4.19+/- 40.79 ages & height 5.26 +/-173.21 cm & weight 75.06 +/-1.12 among the men of Bushehr municipal &Fatemeh Zahra hospital that they were selected randomly. The smoking group included persons who smoking for 5 years & also using 7-20 cigarette in during a day. The conditions for eliminating the volunteers have chronic disease, diabetes, exercising regular sport program in past 3 months heart attack & using different cigarette chosen groups were selected for endurance exercises included 14 middle aged men who smoking & non-athlete & 15 middle aged men who non-smoking & non-athlete. At first, they familiar with the program, the goal of it & the method of its implantation are as oral & written & insured them that their information is as secret.

The method of bloodletting tests

For surveying the biochemical variables the bleeding was done after 12 hours fasting in 2 steps; before starting exercise & after 6-weeks exercising in both control & experimental groups. In first step, for bleeding wants subjects didn't exercise intensity activities 2 days before retest & then bleeding 5m.l them in sitting & resting situation from their hands [between 8-1 o'clock in morning]. In the second step, after finish the exercising course & 24 hours later, after the last session [same as first step in the same condition were bleed them] measuring the blood glucose in fasting was done by enzymatic method by Selectra biochemical auto-analyzers [insulin serum by Immuno Radiometric assay] & by using Kit Im [IM3210] of Immunotecha.s-Czech repulic] but using exercising Gama counter exercise protocol mechanic that it is 5-10 minutes for warming up, 25-30 minutes intermittent running with50-65 percent of saving beat hearts reserve & 10-15 minutes exercise & backing to the first situation that it was done 3 session in each week & by observe the principle of overload 6 weeks.

Statistical analysis

The data that obtained by measuring the variables for analyzing them was used PC-SPSS statistical software of version 18. After descriptive surveying on row data, first; for comparing the before & after average records in each group & then variables comparisons in two groups was used statistical methods; for analyzing the data of pre-test & post-test of experimental groups subsequent in 6 weeks aerobic exercise was used dependent t-test & for determining the differences among groups was used independent t-test & maximum the meaningful level was determined 0.05.

RESULTS AND DISCUSSION

The findings of research were prepared in 1-5 tables. The results showed that for testing the hypothesis whether implementation the aerobic exercise [intermittent running] for 2 days in a week, have effects on smokers' insulin index or not, was used dependent t-test. Since the p-value =0.01 is lower than 0.05, so concluded that this hypothesis will be accepted & for doing the test of the hypothesis; whether the aerobic exercises have effects on fasting blood sugar [FBS] index in smoker group or not, was used dependent t-test since the p-value= 0.037 is lower than 0.05 so this hypothesis will be accepted . There is significant

difference between pre-test & past-test so aerobic exercise have effects on amount of fasting blood sugar [FBS] index & caused to better function. For testing the hypothesis; whether aerobic exercise have effects on non-smokers group's insulin index or not, was used dependent t-test & because the p-value=0.02 is lower than 0.05 so concluded this hypothesis will be accepted. It means that there was significant differences between pre-test &post test. For testing the hypothesis; whether the aerobic exercises have effects on smokers' group fasting blood sugar [FBS] index or not was used dependent t-test since the p-value=0.001 is lower than lower than 0.05 so this hypothesis will be accepted. . It means that there was significant differences between pre-test &post test. For testing the hypothesis that there is difference between the smokers & non-smokers groups' insulin results in chosen 6 weeks aerobic exercise or not, was used independent t-test & since p-value =0.977 is higher than 0.05 so can resulted that the hypothesis similarity of means will be accepted among two groups .it means that there isn't significant difference among means. For testing the hypothesis that there is difference among fasting blood sugar [FBS] in smoker & non-smokers after 6- weeks chosen exercise or not, was used independent t-test. Since p-value=0.876 is higher than 0.05 it means there isn't significant difference among means, so can be resulted that 6-weeks aerobic exercise don't make any significant difference between fasting blood sugar [FBS] among smokers & non-smokers groups

Table [1]: describe the subjects' anthropometrics characteristics

Height	Mean	SD	Freedom rate	Minimum	Maximum
Smoker	172.43	4.38	14	164	182
Non-smoker	173.93	6.02	15	159	182
Weight	Mean	SD	Freedom rate	Minimum	Maximum
Smoker	72.42	1.04	14	57	93
Non-smoker	77.53	1.18	15	60	97
Age [year]	Mean	SD	Freedom rate	Minimum	Maximum
Smoker	42.14	4.28	14	32	48
Non-smoker	39.53	3.75	15	34	47
Body mass index	Mean	SD	Freedom rate	Minimum	Maximum
Smoker	24.08	1.3	14	21.19	28.07
Non-smoker	25.62	1.8	15	23.73	29.28

Table [2]: test the fasting blood sugar [FBS] & insulin for pretesting among smokers & non-smokers

Indexes	Paired differences		T	Freedom rate	P-value
	SD	Mean			
Glucose	11.3705	8.800	2.447	9	0.037
Insulin	6.7604	8.2083	4.206	11	0.001

Table [3]: test fasting blood sugar [FBS] & insulin for pre & post-tests smokers [paired t-test]

Level test for determining equivalent variances			Independent test for determining the equivalent means			
Indexes	F	P-value	T	Freedom rate	P-value	Mean difference
Fasting blood sugar [FBS]	0.347	0.562	-0.084	22	0.937	-0.542
Fasting plasma insulin	0.600	0.446	0.446	26	0.637	1.7583

Table [4]: test the fasting blood sugar [FBS] & insulin for non-smokers per &post tests [paired t-test]

Indexes	Paired difference		T	Freedom rate	P-value
	SD	Mean			
Glucose	7.7718	8.6429	4.161	13	0.001
Insulin	6.9450	6.3813	3.675	15	0.002

Table [5]: test the fasting blood sugar [FBS] & insulin for smokers &non-smokers post tests [independent test]

Level test for determining equivalent variances			Independent test for determining the equivalent means			
Indexes	F	P-value	T	Freedom rate	P-value	Mean difference
Fasting blood sugar [FBS]	0.876	0.901	0.353	-0.158	22	0.876
Fasting plasma insulin	0.997	0.012	0.914	-0.30	26	0.977

CONCLUSION

Stop smoking is the best solution for minimizing diseases caused by smoking but since not they cannot success to stop it. So they need other methods for decreasing the diseases of using cigarette & exercising may help to decrease the diseases [13] but, until now the research about them are too low, so the goal of this study is surveying on effect of 6-weeks chosen aerobic exercise on insulin & serum glucose concentration of passive male smokers &non smokers. The current research showed that aerobic exercise have positive effects on serum insulin & fasting blood sugar [FBS] indexes of smokers & non-smokers. This research showed that aerobic exercise caused to increasing the significant in serum insulin index of each groups that is same as other research [5, 9, 8] perhaps the similarity among them & then more glucose absorb per unit of insulin in during of exercise. Increased the sensitivity of muscles to insulin is happened with low to moderate practice exercise caused to increasing the blood flow to the working muscle as increased the characteristics value & the number of insulin receptors & consequently increased sensitivity to insulin. Regularly sport caused to reduce belly fat, sport increased using peripheral tissues & also help to the weight control & also increased the blood fat is profitable to improving insulin sensitivity. The results of current research isn't same as Babarij's s results [2009] & maybe it is because of differences among intensity of exercise & subjects that they are not same, Barbarij selected youth but this research selected middle aged persons & can result that sport have more effects on middle-aged persons [12]. Bijeh studied on slim & non-smoking women & resulted that aerobic exercise didn't have any effects on insulin. Probably the reasons of dissimilarity among these two researches are because of differences among their subjects. Bijeh's subjects included slim women but this research is middle-aged men [1]. Gray's research is not same as current research because of different in exercise intensity [10]. Other results of this research is significant increasing in subject's fasting blood sugar [FBS] in two groups that it is same as Nayak, Short, Babraj, Shahrijerdi, Tofighi's researches [16, 5] & the reason of this similarity is that when a endurance exercise muscle's glycogen for little time as the muscular activities are continues. Glycogen is a resource for increasing blood glucose & 15 minutes after exercise, liver glycogenolosis& when exercising more over 30 minutes, free fatty acids is starting to works by adipose tissue lopolysis[1]. As results, exercise caused to burn glucose glycogen in muscles & during or after exercise blood glucose will come to the muscle & normalize the level of glucose & glycogen. This research showed the personal profits & significant increasing in subjects' fasting blood sugar [FBS] that isn't same as Segal &Cauza's research [16] & it is because of population that research studied on persons who have diabetes but the current research studied on healthy persons among smoker & non-smoker groups that there isn't significant difference after exercise, maybe the time of exercise program is low. It needs to more effects of sport to judge about it.

Recommendations

1-proposed that other method such as; cycling, swimming, weight training, yoga.
2-proposed that other research studied on smokers that smoking more or lower than our population.
3-proposed that in other research evaluated longer time for exercise

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