

Regular Article

Effects of walking jogging and running program on coronary heart disease risk factors among middle aged men

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Abstract

Physical activity helps to lower blood pressure and cholesterol, and helps reduce obesity, symptoms of anxiety and depression, and symptoms of arthritis. It turns out, to acquire many of these health benefits; exercise does not have to be strenuous. Moderate daily physical activity can substantially reduce the risk of developing or dying from type II diabetes, and a variety of cardiovascular diseases, such as heart disease, hypertension, and stroke. The present study was designed to find out the effects of walking, jogging and running exercises on coronary heart disease risk factors among middle aged men. Forty middle aged men of teaching and nonteaching staff members belong to the Department of Physical Education and Sports Sciences, Annamalai University was selected as subjects and their age group ranges from 35-40 years. Selected subjects were classified into four groups with 10 members each. Group I act as Control, Group II underwent walking, Group III Jogging and Group IV Running. Exercise programme were given to the training groups for a period of 3 days /week for 12 weeks. The variables selected for this study were body weight, blood glucose and blood pressure (systolic and diastolic). The staff members were trained with the regular schedule timings initiating with the light warm-up, walking jogging and running exercise of the concerned group. The intensities were progressively increased at the end of every week. Data were collected and statistically analyzed using ANOVA and DMRT. Results showed that walking, jogging and running significantly reduces the coronary risk factors in middle aged men. It is also observed that better effect was seen in running people when compared to walking and jogging groups at the rate of intensity increased. Thus the study revealed that 12 weeks of running program in middle aged men produced better moderations in cardiac risk factors and retains them healthier life.

Keywords: Body-weight, Blood glucose, Blood pressure (systolic and diastolic), Coronary heart disease, Walking, Jogging and running

Introduction

Cardiovascular disease (CVD) is the leading cause of death in India (Mukherjee, 1995) and its contribution to mortality is rising; deaths due to CVD are expected to double between 1985–2015. (Reddy 1993; Reddy and Yusuf 1998; Bulatao and Stephens 1990). Regular physical activity reduces the risk of obesity, blood lipid abnormalities, hypertension, and non-insulin dependent diabetes mellitus (Pate et al., 1995; Department of Health and Human Service, 1996) has been shown to reduce substantially the risk of coronary heart disease (CHD). Conversely, measures of sedentary lifestyles or physical inactivity have been associated with a 1.5- to 2.4-fold elevation in CHD risk (Pate et al., 1995). In a study, it is estimated that US\$24 billion or 2.4% of the US health care expenditure is directly related to a lack of physical activity. (Colditz, 1999).

As a result of economic changes and increased mechanization, the prevalence of physical inactivity is increasing in India, particularly in urban areas, to levels comparable with the West. (Department of Health and Human Service 1996; Vaz and Bharathi 2000; National Institutes of Health, 1996). However, the association between leisure-time exercise, sedentary lifestyles, and risk of CHD has not been assessed within India. People are more prone to the risk of this chronic stage due to their sedentary lifestyle and food habits. In order to bring awareness among middle aged people and put a

solution to the rising deaths in future life. We planned to study the effect of walking, jogging and running on middle aged men on selected coronary risk factors. The study determines the better way to keep our body and mind in a healthy way.

Methodology

Selection of subjects

Forty middle aged men of teaching and non-teaching staffs were randomly selected as subjects from the Department of Physical Education and Sports Sciences of Annamalai University and their age ranges between 35–40 years. Selected subjects were divided into four groups with ten members in each.

Experimental design

The study was intended to investigate the effect of walking, jogging training programme on selected coronary risk factors among middle aged men. The selected subjects were divided into four groups. Experimental subjects performing walking, jogging and running exercises and control group remain as normal without workout.

Group I acts as Control Group (without training) who did not participate any special training apart from the regular activities.

Group II –under went walking starts their workload with low intensity to medium intensity and for twelve weeks (3 days/week)

Group III –served as jogging training group for twelve weeks (3 days/week).

Group IV served as running group and the training initiated with low intensity to medium intensity workload. Training was conducted in the Department of Physical Education and Sports Sciences, Annamalai University for a period of 3 months (3 days/week).

Training Programme

The experimental group underwent the exercise training consisted of 40 to 60 minute sessions divided into five stages: warm-up (5 to 10 minutes); principle aerobic activity (10 minutes); cool-down (3 to 10 minutes); localized work (10 to 25 minutes); and stretching (5 to 15 minutes). During the principle activity, the intensity of the exercise was controlled by the heart rate, with the target rate being between 140–160 beats/min (American Heart Association). Initial training with low intensity for few weeks (50% workload) and extended up to 75% work load to reach the target level.

Exercise Training Protocol– (Sports Medicine-
www2.massgeneral.org/.../protocols/)

General Instructions

Progression from walking to jogging to running

- Walking /jogging /running should be done no more than three times a week.
- The program should be performed step by step. Do not advance your program until you can successfully complete the initial step. Let pain and swelling be your guide. If the activity creates pain, swelling or causes you to limp, go back to the previous step.
- Before starting the program and after completion of the program, allow 15 minutes to perform stretching exercises.

- Ice the injured area for 20 minutes after stretching.
- Training programme is performed for 12 weeks (3days/week). The protocol is followed for the rest of the weeks to complete the training programme. Continue to increase distance by 1/4 mile per session until you reach your desired distance. The speed and the distance is increased upto the training period and the subjects performed at the endphase.
- For distance runners, you can continue to increase distance by 1/4 mile per session until you reach your desired distance. when you have reached your training distance without causing any pain or swelling, and have a normal running form, you can gradually start to increase your running speed.
- Be careful to be sure that you warm-up well and stretch lightly before workout, and stretch well again after workouts. generally, you should do some walking, cycling or jogging so that you break a sweat before starting the running program. You should then stretch before beginning the running drills. Ice your knee for 20 minutes

following workouts after stretching again as you are cooling down.

- The initial exercise dosage was prescribed individually. At the beginning of training, the steady state heart rate of every subject was measured manually during a performance of the endurance exercise. Intensity was progressively increased until the frequency of 140 to 160 beats per min was reached.
- Training started at this work load and was thereafter adjusted to meet changes in the performance capacity of the subjects. Adjustment was made periodically (once a week in the early phase of the study and later once a month) after measuring subjects' heart rates. Although a heart rate of 140 to 160 beats per min was generally the intensity objective, this objective was reduced whenever musculoskeletal complaints so dictated. All training sessions were conducted by the same trainer, together with an assistant. They taught the subjects to carry out their programs independently.

Walking training programme				
Phase1				
Monday	Walk	1/4 Mile	Easy pace	1/2 Speed
Wednesday	Walk	1/4 Mile	Speed	3/4 Speed
Friday	Walk	1/4 Mile	Briskly	Full Speed
Phase2				
Monday	Walk	1/2 Mile	Easy Pace	1/2 Speed
Wednesday	Walk	1/2 Mile	Speed	3/4 Speed
Friday	Walk	1/2 Mile	Briskly	Full Speed
Phase3				
Monday	Walk	3/4 Mile	Speed	Speed
Wednesday	Walk	3/4 Mile	Briskly	Full Speed
Friday	Walk	1 Mile	Comfortable Pace	3/4 Full Speed

Jogging training programme				
Phase1				
Monday	Jogging	1/4 Mile	Comfortable Pace	Walk mile 3/4
Wednesday	Jogging	1/2 Mile	Comfortable Pace	Walk Mile 1/2
Friday	Jogging	3/4 Mile	Comfortable Pace	Walk Mile 1/4
Phase2				
Monday	Jogging	3/1 Mile	Comfotable Pace	Walk Mile 1/4
Wednesday	Jogging	1 Mile	Normal	1 repetition
Friday	Jogging	1 Mile	Normal	1 repetition
Phase3				
Monday	Jogging	1/2 Speed	100mts Continue	2 repetitions
Wednesday	Jogging	3/4 Speed	100mts Continue	2 repetitions
Friday	Jogging	1Mile	Normal	2 repetitions

Running training programme				
Frequency : 3 times per week, Repeat previous steps can be skipped if the running causes no problems.				
Phase 1				
Monday	Brisk Walk	3/4 Mile	Speed	Speed
Wednesday	Brisk Walk	3/4 Mile	Briskly	Full Speed
Friday	Run	1/4 Mile	Comfortable Pace	3/4 Full Speed
Phase 2				
Monday	Run	1/2 Speed	100Yards Continue	2 repetitions
Wednesday	Run	3/4 Speed	100Yards Continue	2 repetitions
Friday	Run		Full Speed	2 repetitions
Phase3				
Monday	Zig-Zag –Run	Round Corner	50 Yards	5 repetitions
Wednesday	Forward-Run Backward-Run	Gradual Stop	25 Yards	4 repetitions
Friday	Normal –Run	Continous	100 Yards	3 repetitions

Testing Variables

Body weight measured by weighing machine and Blood glucose measured using Orthotoludine test in Clinical lab and Blood pressure measured by sphygmomanometer.

Statistical analysis

Variables were assessed before and after 3 months of training. The resulted data were collected and analyzed using ANOVA and the group means were compared by Duncan's Multiple Range Test (DMRT). The differences were considered to be significant when $p \leq 0.01$.

Results

Table 1: Change in the body weight in control and experimental training groups

Groups	Body weight (kg)
Control	72.34 ± 0.2 ^a
Walking	68.94 ± 0.02 ^b
Jogging	67.26 ± 0.04 ^c
Running	65.16 ± 0.4 ^d

Data represents mean ± SD from 10 subjects in each group.

Values not sharing a common superscript letter (a,b,c,d) differ significantly at $p < 0.01$ (Duncan's multiple range test)

Group comparison: Group one with all, Group 2 and 3 with 4.

The table value required for significance at 0.01 level of confidence with df 3 and 39 is 1.697

Table 2: Changes in the levels of Blood Glucose in control and experimental training groups

Groups	Blood glucose (mg/dl)
Control	115.3 ± 0.1 ^a
Walking	110.43 ± 0.3 ^b
Jogging	105.39 ± 0.6 ^c
Running	102.00 ± 0.4 ^d

Data represents mean ± SD from 10 subjects in each group.

Values not sharing a common superscript letter (a,b,c,d) differ significantly at $p < 0.01$ (Duncan's multiple range test)

Group comparison: Group one with all, Group 2 and 3 with 4.

The table value required for significance at 0.01 level of confidence with df 3 and 39 is 1.697

Table 3: Changes in the levels of Blood Pressure in control and experimental training groups

Groups	Systolic Blood Pressure (mm Hg)	Diastolic Blood Pressure (mm Hg)
Control	144.59 ± 0.29 ^a	89.36 ± 0.04 ^a
Walking	140.29 ± 0.04 ^b	87.24 ± 0.02 ^b
Jogging	138.18 ± 0.7 ^c	84.14 ± 0.03 ^c
Running	132.18 ± 0.1 ^d	80.2 ± 0.02 ^d

Data represents mean ± SD from 10 subjects in each group.

Values not sharing a common superscript letter (a,b,c,d) differ significantly at $p < 0.01$ (Duncan's multiple range test)

Group comparison: Group one with all, Group 2 and 3 with 4.

The table value required for significance at 0.01 level of confidence with df 3 and 39 is 1.697

Table 1 shows the significant changes in the body weight in control and experimental training groups.

Change in body weight was observed in all training groups compared to control. But significant reduction was seen in Body weight in running groups when compared to walking and jogging. A better result was produced in running group.

Table 2 depicts the Blood glucose levels in control and experimental training groups. Decrease in blood glucose was found in the experimental groups compared to normal subjects. 12 weeks of training effectively reduces the blood glucose level in running men than other training groups.

Table 3 shows the changes in systolic and diastolic blood pressure in control and experimental training groups. The training groups significantly moderate the blood pressure than control. It is also observed that better result was produced by running men in reducing the blood pressure and maintains the normal.

Discussions

In our study 12 weeks of training programme such as walking, jogging and running predominantly moderates the selected risk factors of coronary heart diseases in middle aged men. Subjects

performing running exercise found to be more effective in reducing the body weight, blood glucose and blood pressure and retains to normal healthy life.

Heart disease is still the primary cause of death in both men and women. Arthritis is the cause of disability in adults. And overweight and obesity affect an astounding of all middle aged people. Imagine how much of this disease could be prevented by simply participating in a regular walking program.

Study showed that mechanisms through which walking reduces the risk of death and cardiovascular disease are unknown, presumably such an effect is achieved through a variety of indirect pathways that could influence cardiovascular fitness, hypertension, lipid profiles, clotting factors, and other concomitant risk factors (Amy et al., 2010). Although the effect of walking on coronary heart disease was independent of major risk factors that were determined at the time walking was assessed, it may be that men who walk are more resistant to acute risk factor changes or transitions into adverse risk factor states. For example, men without hypertension who walk regularly may be less prone to develop hypertension than similar men who are sedentary (Amy et al., 2010).

Although the effects of walking on reducing the risk of mortality appear to be constant across levels of total caloric intake, the

percent of calories from protein, fat, and carbohydrates, and the percent preference for a Japanese diet, a combined attention to nutrition and active lifestyles would seem to be the best way to minimize the risk of cardiovascular disease (Stefanick et al., 1998).

Even if walking does not have an independent effect on coronary heart disease, its potential effect through unknown indirect pathways makes it worthy of promotion as a behavior that can prevent or delay the onset of disease. This is especially important because regular walking may be more easily adopted and adhered to in the elderly than more vigorous and stressful exercise. Combined with evidence that suggests that active lifestyles reduce the risk of cardiovascular disease and other adverse outcomes in younger and more diverse groups, this suggests that encouraging the physically capable elderly person to walk and to become active could have important health benefits. It seems prudent that such encouragement should be given as early in life as possible, when good habits are more easily developed.

Obesity is an independent risk factor for the development of heart disease (Hubert et al., 1983). The effects of obesity are moderated by the age of onset and its duration. Longitudinal studies have repeatedly shown that weight loss is associated with an improvement in coronary risk factors there is a resultant decrease in cholesterol levels and blood pressure, and an improvement in glucose intolerance (Noppa, 1980; Ashley, 1974). The resultant changes in these risk factors are accompanied by changes in the risk of ischaemic heart disease (Williams et al., 1982). Continuing an exercise programme results in a sustained weight loss. This weight loss is seen within three months of starting to exercise and in a jogging programme the weight loss is proportional to the miles run each week (Williams et al., 1982). But in our study, running group significantly reduces the body weight then jogging and walking. Though the distance covered by the subjects were comparatively less than jogging and walking groups. Potentially they showed their improvement in speed, flexibility of joining muscle tendons and the weapons to burn the calories in short time practice prevalence to maintain healthy body.

Regular vigorous exercise, physical activity can be the part of a healthy lifestyle of today's young adults. Canabal Torres (1994) conducted a study to find out the effect of exercise, physical activity on diabetes mellitus patients. Vigorous regular exercise was given to the 60 women who were in experimental group and significant improvement was found on the cardiovascular fitness, flexibility, psychological realms and blood sugar level than the control. In our study, 12 weeks of training programme of walking, jogging and running modifies the blood glucose level. But running helps more in moderating the blood glucose levels than other active groups in maintaining the blood glucose and thereby controls the body weight. Previous research stated that six-month study of 23 middle-aged males with essential hypertension it was found that a walking-jogging programme alone reduced their systolic blood pressure by a mean value of 14 mmHg and their diastolic blood pressure by a mean value of 12 mmHg (Boyer and Kasch 1970). In a comparison group of normotensive males undertaking the same programme there was no change in their systolic pressures, but their diastolic blood pressure decreased by a mean value of 6 mmHg. Longitudinal studies of Harvard alumni have shown that continued participation in vigorous exercise results in an incidence rate for hypertension that is 75 per cent of the rate of those not engaged in such activities (Paffenbarger et al., 1983).

We found no more significant differences in blood pressure between joggers and non-joggers. In a research Hartung, et al, in comparing marathoners, joggers, and inactive persons, found that joggers had higher systolic and diastolic blood pressures than did the other two groups (Hartung et al., 1980). Another case control study showed no significant differences in blood pressures between long distance runners and controls (Adner and Castelli, 1980).

Among cohort studies, two reported no significant relationship between jogging and blood pressure or hypertension. (Kannel and Sorlie 1979; Epstein et al., 1976) However, one large cohort study showed significantly lower blood pressures among those with higher activity during their leisure time (Hickey et al., 1975). More researches were carried out to support our finding in blood pressure between joggers and non joggers and helps to conclude that our 12 weeks training found to be effective in running groups

performed at low intensity to moderate level retains both systolic and diastolic pressure to normal than other training groups.

Beginning an exercise programme and adhering to it is a major change in behavior for most people. Training programmes should begin slowly with warm up and cool down periods at each session. Individuals should gradually build up to greater levels of exercise to avoid the musculoskeletal injuries which occur in as many as one-third of joggers and runners.

Running serves as an excellent workout choice to lose weight and keep in shape. It helps a great deal in getting rid of your flabby abs and achieves a beautiful body that you had always craved for. In fact, today, health experts also recommend running for weight loss. The results won't be magical but definitely far more effective, when compared to other forms of physical workouts.

There is no need to necessarily go in for fast pace running to lose weight. Rather, focus on long distance running at a slow pace, to fasten your weight loss program. People tend to diet to shape up their bodies, but it is definitely not a good idea to control weight. In fact, on the contrary, it is advisable to forego the very thought of going on a diet and rather make an attempt to run to lose weight. So, lose weight by running, because that is a healthy way of managing your weight and also it will ensure the glow on your face. When you want to lose weight running you should take care of a few advices that will help you about the administration of the food and will have instantly results. The most of trainers recommend this and say that is the healthiest way to lose weight and to prevent us from various diseases.

Conclusions

There is much evidence to suggest that exercise might be beneficial by altering the risk factors for ischaemic heart disease. The changes brought about by exercise - improvement in physical fitness, reduction in blood pressure and weight - make this an attractive procedure for risk factor modification in the motivated person.

However, exercise clearly establishes healthier profiles that ultimately increase functional capacity at most ages and reduces the lifetime risk of disease and disability. Major coronary disease risk factors, many of which are modifiable, are strong contributors to prediction of future risk, even in young men. These data may help in formulating appropriate strategies to identify young men at heightened risk for death from coronary heart disease in later adulthood.

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