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Original Research Article

To assess nutritional status and cardio respiratory variables by intervention of 42 days jogging in medical students

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Abstract:

Background & Method: The aim of this study is to assess nutritional status and to investigate the cardio respiratory parameters in medical students by intervention of 42 days period of jogging. 42 healthy medical students aged between 17 to 25 years were included in the study to test their nutritional assessment and to study cardio respiratory variables. After obtaining written consent, radial pulse is measured for one minute and blood pressure is measured on left arm by auscultatory methods using mercury sphygmomanometer. Pulmonary function test is done by Ganshorn LT8 PFT Machine .Weight is measured by weighing machine and height is taken by stature meter. All parameter is measured be on first day and after 42 days period of jogging

Result: Mean value of weight has 60.38 ± 9.02 kgs before the jogging and after the 42 days of jogging, it became 60.55 ± 8.86 kgs, t value is 0.778 and p value is 0.441 which is not statically significant. Mean value of height is same before and after the jogging that is 169.54± 5.65 cms, t value is 1.403 and p value is 0.168 which is not statically significant. Mean value of B.M.I is 20.88 ± 2.38 kg/m^2 before the jogging and it became 20.91 ± 2.41kg/m^2, t value is 0.276 and p value is 0.784 which is not statically significant. Mean value of energy intake is 2065.45 ± 331.91 kcal and it became 2301.55 ± 367.64 kcal, t value is 8.336 and p value is 0.001 which is a statically significant.

Pulse is reduced from 75.45 ± 5.76 to 73.12 ± 5.89 per minute, t value is 3.572 with p value, 0.001 which is a statically significant .Systolic blood pressure is reduced from 120.93 ± 7.82 mmHg to 119.04 ± 8.78 mmHg, t value is 3.47 with p value, 0.0005 which is a statically significant. Diastolic blood pressure is reduced from 80.82 ±2.93 mmHg to 78.23 ± 3.73 mmHg ,t value is 6.33 with p value, 0.0001. Which is a statically significant

Respiratory variable, FCV which is 3.74 ± 0. 44 before jogging it become 3.77 ± 0.45, t value is 1.00 with p value 0.32 which is not statically significant.

Conclusion:

Weight of subjects is not shown significant changed after intervention of 42 days period of jogging .Height in subjects remains same during this period. BMI is not significantly changed due to no change in weight and heights of subjects. As, it is calculated by person's weight in kilograms divided by the square of his height in meters (kg/m^2) . There is increased in energy (calories) intake of subjects which is due to increased expenditure of energy during jogging . Pulse and blood pressure (Systolic and diastolic) is reduced after 42 days of jogging that

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reflected that jogging affect cardiovascular system of subjects . FVC is not changed after 42 days of jogging shown that jogging do not affect force vital capacity of lungs. So, more than 42 days is essential to seen changes in FVC . However, it is concluded and suggested that further studies need to be done to make that facts as the scientifically accepted document.
Keywords: Nutritional, cardio respiratory, medical students.

Study Designed: longitudinal Study.

1. INTRODUCTION

Concept of fitness is being defined as, good health in general manner. Individual with good fitness is able to cope with the general demands of living. Cardio respiratory fitness is the ability to perform aerobic exercise using large muscle groups at moderate to high intensity for prolonged periods(ACSM 1995). VO2 max is considered best indicator of cardio respiratory fitness and aerobic endurance. It measures the capacity of the heart and lungs, to transport oxygen to working muscles, and measures the consumption of oxygen in body. Cardio respiratory fitness is a good indicator of overall health. Low levels of cardio respiratory fitness from a sedentary lifestyle have been associated with an increased risk of premature death from cardiovascular disease. Moderate to high levels of prolonged physical activity can improve cardio respiratory fitness (1). There are a number of ways to measure cardio respiratory fitness. A quick and easy method is to use field tests that involve walking or running a certain distance in a given time. The advantage of field tests is that little equipment is needed. These tests require maximal effort, therefore may not be appropriate for sedentary individuals at increased risk for cardiovascular and musculoskeletal complications.

Jogging is the form of aerobic excise with mild pace running. It benefits cardiovascular system. It effect metabolism and nutritional state with many other system of body. Mood is also influenced by jogging, it improve psychological well being of individuals.

Indices of nutritional status (weight) definitely influence lung function independent of isotropic growth, and weight represents an important and convenient surrogate marker of nutritional status.After puberty major divergence between boys and girls occur, with males ultimately having substantially greater lung volumes for height than females.

In Senegal in the study on school age slightly malnourished children of 10- 12 of age, no association was observed between the activity indices and nutritional status, while there was small but significant correlations between activity, physical fitness and motor performance characteristics.In contrast, in older adolescent girls, there was a significant positive relationship between body mass index and physical activity.

2. MATERIAL & METHOD

The present study will be carried out in the Department of Physiology, Mahatma Gandhi Memorial Medical College, Indore. 42 healthy medical students aged between 17 to 25 years will be included in the study to test their nutritional assessment and study cardio respiratory variables after intervention 42 days period of jogging. Written consent is taken from all students involved in study . All parameters is measured in standard conditions

Criteria of inclusion: Only those subjects will be included in the study that does not have any respiratory, cardiac, neuromuscular, metabolic and endocrine disorder.

Criteria of exclusion: Subjects who developed any kind of discomfort during jogging.

Weight (kilograms): Body weight will be measured (to the nearest 0.5kilograms).Subject will be made to stand erect on the centre of platform of the weighing machine and reading is taken in kilograms.

Height (centimeters): Using stature meter, height will be measured without shoes and subject made to stand on the flat floor with feet parallel .The head is held perfectly erect with

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lower border of orbit in the same planes as the external auditory meatus and arm hanging at the sides in a natural manner. Scale is gently lowered to make contact with pressure just to crush the hair and reading is taken

Blood Pressure and Pulse: The individual will make comfortable and seat for five minutes in the chair before measured pulse and blood pressure. Radial pulse left arm is count for one minute. Blood pressure is measured on left arm by auscultatory methods using mercury sphygmomanometer.

Respiratory Variables: Force vital capacity, it is measured by using Ganshorn LT8 computerized pulmonary function testing machine.

Jogging: Students done jogging on dry mud tracks for 30 minutes daily for 42 days

3. RESULTS

Table No.1: Nutritional status by Asian (BMI) classification

Nutritional status of subjects	BMI(kg/m2)	Prejogging	Post jogging
	Range	Number of cases	Number of cases
Underweight	16-18.5	9	09
Normal weight	18.5- 22.9	22	23
Overweight	23-24.9	09	08
Obese 1	25 -29.9	02	02
Obese 2	>30	0	0
	TOTAL	42	42

Above table shows nutritional status of 42 Subjects undergone 42 days period of jogging :Before jogging ,9 are underweight ,22 are in normal weight , 9 have overweight and only 2 has obesity 1 category , but after jogging of 42 days, there is no change in underweight category(09) , one subject improved in (23) in normal weight category, 8 have overweight, only one subjects lose weight , no change in obesity 1 category (02)

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Table No. 2: Energy intake distribution in subjects Prejogging and Post jogging

Range of Energy intake(kilo calories)	Pre Jogging		Post Jogging	
	Number of cases	Percentage (%)	Number of cases	Percentage (%)
1500-1800	12	28.57	05	11.90
1801-2100	14	33.33	11	26.61
2101-2400	09	21.42	09	21.42
2401-2700	5	11.90	11	26.19
2701-3000	2	4.76	6	14.28
TOTAL	42	100	42	100

Above table shows energy expenditure distribution in study population. Study population included 42 subjects, Out of which,

12 subjects (28.57%) had in the range of 1500-1800 **kilo calories**,

14 subjects (33.33%) had in the range of 1801-2100 **kilo calories**,

09 subjects (21.42%) had in the range of 2101-2400 **kilo calories**,

5 subjects (11.90 %) had in the range of 2401-2700 **kilo calories**,

and 2 subjects (4.76%) had in the range of 2701-3000 kilocalories before started the jogging.

- After the 42 days of jogging,

Only 5 subjects (11.90%) remain out of 12 subjects in this range of 1500-1800 **kilo calories**,

, 11 subjects (26.61%) remain out of 14 in this range of 1801-2100 **kilo calories**,

, 09subjects (21.42%) in the range of 2101-2400 **kilo calories**,

, 11 subjects (26.19%) come in this range 2401-2700 **kilo calories**, there is change in intake of energy by 6 subjects .

and 6 subjects (14.28%) come in this range of 2701-3000 kilocaries . there is change in intake of energy by 4 subjects.

Table No. 3: Means Value and Standard Deviation of Weight, Height, BMI and Energy Intakes

Variables	Prejogging	Postjogging	Value	
	Mean ± SD	Mean ± SD	T	P
Weight (Kgs)	60.38± 9.02	60.55 ± 8.86	0.778	0.441
Height (cms)	169.54 ± 5.65	169.55 ± 5.65	1. 403	0.168
BMI (kg/m2)	20.88 ± 2.38	20.91 ± 2.41	0.276	0.784

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Energy intake (kilocalories)	2065.45 ± 331.91	2301.55 ± 367.64	8.336	.001

Above table shows the anthropometric parameter of study population.

- Mean value of weight has 60.38 ± 9.02 kgs before the jogging and after the 42 days of jogging it became 60.55 ± 8.86 kgs, t value is 0.778 and p value is 0.441 which is statically insignificant**.**
- Mean value of height is same before and after the jogging that is 169.54± 5.65 cms, t value is 1.403 and p value is 0.168 which is not statically significant
- Mean value of B.M.I is 20.88 ± 2.38 kg/m2 before the jogging and it became 20.91 ± 2.41kg/m2, t value is 0.276 and p value is 0.784 which is not statically significant
- Mean value of energy intake is 2065 .45 ± 331.91 kcal and it became 2301.55 ± 367.64 kcal, t value is 8.336 and p value is 0.001 which is a statically significant.

Table No 4: Means Value and Standard Deviation of systolic blood pressure and diastolic pressure and pulse

Variables	**Prejogging**	**Post jogging**	**Value**	
Blood pressure (mmHg)	**Mean ± SD**	**Mean ± SD**	**t**	**P**
SBP	**120.93 ± 7.82**	**119.04± 8.78**	**3.47**	**0.0005**
DBP	**80 .82 ± 2.93**	**78.23 ± 3.73**	**6.33**	**0.0001**
Pulse	75.45 ± 5.76	73.12 ± 5.89	3.572	.001

- Mean value of SBP is **120.93 ± 7.**82 and it became, **119.04± 8.78,** t value is 3.47 and p value is 0.0005 which is a statically significant.
- Mean value of SBP is **80.82 ± 2.93** and it became,78.23 **± 3.73,** t value is 6.33 and p value is 0.0001 which is a statically significant.
- Mean value of pulse is **75.45 ± 5.**76 and it became, **73.12± 5.89,** t value is 3.572 and p value is 0.001 which is a statically significant.

Table No 5: Show Means Value and Standard Deviation of force vital capacity

Variables	**Prejogging**	**Post jogging**	**Value**	
	Mean ± SD	**Mean ± SD**	**t**	**P**
FVC(liters)	**3.74 ± 0.44**	**3. 77 + 0.45**	**1**	**0.32**

- Mean value of FVC is **3.74 ± 0.**44 and it became, **3.77.± 0.45,** t value is 1 and p value is 0.32 which is a not statically significant.

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4. DISCUSSION

Study sample is comprised by the 42 young healthy subjects 17-25 age medical students. Pair t" test is applied for the comparison of pre and post parameters of jogging after intervention of 42 days.

Energy intake: The energy (calories) intake increased in the subjects after 42 days of jogging. Mean value of energy intake before the jogging was the 2065.45 ± 331.91 kcals and after the jogging it was 2301.55 ± 367.64 kcals with p value of 0.001 which is statistically significant. This shows that there is definate increase in the energy intake in subjects during the period of jogging. This may be due to increased expenditure of energy during jogging (2)

Nutritional status: BMI is not much affected by jogging as it is calculated numerically by weight / (height) ^{2} .These are not affected in our study population. Most of subject are in normal weight range before and after of jogging. Weight loss is found in only one overweight subject.

Cardiovascular system variables: Systolic blood pressure(SBP) is reduced by jogging of 42 days from 120.93 ± 7.82 to 119.04 ± 8.78 mmHg and diasystolic blood pressure is reduced from 80.82 ± 2.93 to 78.23 ± 3.73 mmHg . Pulse is reduced to 73. ± 12 5.89 from 75.45 ± 5.76 per minute. Thus, SBP ,DBP and Pulse are reduced by jogging of 42 days. This shows that, jogging (aerobic exercise) reduced the blood pressure and pulse in normotensive 17 -25 years' subjects (3). This result is supported by a previous study that reported that aerobic training induces significant physiological adaptations in the cardio-vascular system .The reduction of Heart rate (pulse), SBP, and DBP in the aerobic exercise subjects after aerobic training might be due to nitric oxide, an important and potent endothelium-derived relaxing factor that facilitates blood vessel dilatation and decreases vascular resistance.

Respiratory variable, Force Vital Capacity (FCV) is the volume of air that is expired rapidly with maximum force, following a maximum inspiration. It is indicator of lung function depend on airways resistance, lung compliance and contraction of respiratory muscles. There is no significant change is seen in 42 days of jogging period but many study show improved with long duration of period .So more than 42 days is essential to seen changes in FVC (4)

5. CONCLUSION

There is increased in energy (calories) intake of subjects during the 42 days period of jogging. BMI is not affected by jogging. So there is not much change in nutritional status of subjects. Pulse and blood pressure (SBP and DBP) is reduced after 42 days period of jogging. Force vital capacity is not change after 42 days period of jogging. However, it is concluded and suggested that further studies need to be done to make that facts as the scientifically accepted document.

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