

Assessment of Level of Physical Fitness and Level of Mental Stress in Exercising and Non-Exercising Individuals

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Abstract: *Exercise has become really important in everyone's life. For living a healthy life it is important to have healthy body as well as healthy mind. Objective of the study was to compare and correlate level of physical fitness and level of mental stress in exercising and non-exercising individuals. 30 participants were taken, 15 in each group. Modified Harvard step test and perceived stress scale questionnaire was used to compare and correlate physical fitness and mental stress respectively. Results showed higher physical fitness ($p=0.0003$) and lower mental stress level ($p=0.0119$) in exercising group and positive correlation between physical fitness and mental stress. ($r=0.5349$).*

Keywords: Physical fitness index, mental stress, Modified Harvard step test, Perceived stress scale

1. Introduction

There are many mental stressors in everyone's life which has to be overcome by managing the mental stress. Meditation, Yoga, Tai Chi, Relaxation, Music Therapy and Exercises are some ways to reduce the mental stress.

Exercise is something with which you can reduce the mental stress as well as maintain the fitness. Rest other techniques of reducing mental stress might be difficult for some individuals to perform. It requires patience and peace which is difficult to get as the individuals at this age have responsibilities towards their family and work. Doing exercises helps the individuals to participate actively. This helps in mental stress reduction and maintain or increase fitness.

When we exercise our body releases hormones named endorphins. Endorphins interact with the receptors in the cortex and reduce the perception of discomfort. They also trigger a positive feeling in body similar to that of morphine.[9]

Physical Fitness is defined as ability to carry-out daily tasks with vigor and alertness with-out undue fatigue with ample energy to enjoy leisure time pursuits, to meet unusual situations and unforeseen emergencies.[1]

Physical Fitness index is the used to measure the physical fitness of the individual using Modified Harvard step test. This test measures the cardio-pulmonary component of the individual. It is a type of cardiac mental stress test for detecting and diagnosing CVS disease. It also is a good measurement of fitness and a person's ability to recover after a strenuous exercise. The more quickly the heart rate returns to resting, the better shape the person is in.[4]

Mental stress is a feeling of strain and pressure. Also this is one type of psychological pain.[4] Excessive amount of

mental stress, however, may lead to bodily harm. Mental stress can increase the risk of strokes, heart attacks, ulcers, dwarfism and mental illness such as depression.[9]

Mental stress can be measured by how we feel it with the help of perceived stress scale.[2]

Perceived stress scale was developed to measure the degree to which situations in one's life are appraised stressful. Psychological stress has been defined as the extent to which persons perceive (appraise) that their demands exceed their ability to cope.[4]

In this age group of 30 years to 50 years, people have their own and family's responsibility and this is the age where people work the most or are responsible the most. Also the health awareness nowadays is on higher side, so to live a healthy life it is also important to keep the mind healthy. Doing exercise on a regular basis can serve both the purpose i.e. keeping the mind and body fit, and making the lifestyle of the individual healthy.

2. Methods

Aim: To assess of level of physical fitness and level of mental stress in exercising and non-exercising individuals. Study was conducted in K. J. Somaiya college of physiotherapy. 30 participants of age 30-50, both males and females were included in the study.

The participants were divided into two groups i.e. Exercising individuals and Non-exercising individuals. Participants who exercise regularly more than 2 months were included in exercising group and participants who do not exercise more than 2 months were included in non-exercising group. The exercising individuals were exercising more than 2 months, moderate to high intensity, for 45min to 1 hour- 3 to 4 times a week, performing

various types of exercises such as aerobic, strengthening, zumba, yoga, mat exercises, ball exercises etc.

Participants who have any knee problem, having any kind of psychiatric or psychological condition, and individuals performing any kind of mental stress relieving technique were excluded from the study. Participants had to perform a modified Harvard step test and fill the perceived stress scale questionnaire.

Modified Harvard step test was done to check the physical fitness of the individuals. A stepper of 20" height was taken for the test.(Fig.1-3) Participants were asked to step up and down for 3 minutes, at a speed of one step/2 sec. Pulse rate was taken post test at 1-1.5, 2-2.5, 3-3.5. Using the following formula the fitness index was calculated.

$$\text{Formula: Physical fitness index} = \frac{\text{totaltimeinsec} * 100}{\text{totalpulsecount} * 2}$$

Rating fitness index:

- Excellent: >96
- Good: 83-96
- Average: 68-82
- Low average: 54-67
- Poor: <54

Perceived stress scale was used to assess the level of mental stress perceived by the individuals. A questionnaire was given which has 10 questions and the participant had to circle the number to indicate how often they felt or thought a certain way. [2][scale 1]

The numbers were:

- 0=Never
- 1=Almost never
- 2=Sometimes
- 3=Fairly often
- 4=Very often

The total score was given out of 40. Score was interpreted as:

- 0-13:Low mental stress
- 14-26:Moderate mental stress
- 27-40:High mental stress

Analysis:

Table no.1: Comparing Physical fitness index in both the groups:

Unpaired t test was done. P=0.0003; t=4.190 with 28 degrees of freedom which indicates it is extremely significant

Parameters	PFI(exs)	PFI(Nexs)
Mean	72.862	62.891
No. of points	15	15
Std deviation	6.788	6.235
Std error	1.753	1.610
Minimum	63.810	56.200
Maximum	87.690	76.670
Median	72.620	60.440
Lower 95% CI	69.103	59.437
Upper 95% CI	76.621	66.344

Table 2: Comparing PSS in both the groups: Unpaired t test was done. P=0.0119; t=2.690 with 28 degrees of freedom which indicates it is significant.

Correlation between PFI and PSS:

Correlation co-efficient(r)=-0.5349

Which is very significant.

Parameters	PSS(exs)	PSS(Nexs)
Mean	13.667	16.867
No. of points	15	15
Std deviation	3.658	2.800
Std error	0.9445	0.7229
Minimum	8.000	10.000
Maximum	21.000	20.000
Median	13.000	18.000
Lower 95% CI	11.641	15.316
Upper 95% CI	15.693	18.417

3. Results

Aim was to assess the physical fitness and level of mental stress in exercising and non-exercising groups.

Comparing physical fitness index(PFI) of both the groups; exercising group has higher mean value compared to non-exercising group. Which means that physical fitness is more in the exercising group than non-exercising group.(graph1)

Comparing mental stress level of both the groups; exercising group has lower mean value compared to non-exercising group. Which means that level of mental stress is less in exercising group than non-exercising group.(graph2)

Correlation between PFI and PSS is very significant, moderate in strength, which is inversely proportional. [correlation coefficient(r)=-0.5349; p value=0.0023] (Graph 3).

4. Discussion

The aim of the study was to assess the physical fitness and level of mental stress in exercising and non-exercising individuals. Methods used to assess physical fitness and mental stress, were modified Harvard step test and perceived stress scale respectively.

Several studies have established that physical fitness is necessary to carry out daily task. The effect of regular exercise is known to have beneficial effect on health. Importance of physical fitness has been mentioned in the history of mankind including Vedas. Yet physiology of exercise is a recent advancement and is an open field for research.[8]

This study was done to observe the effect of exercise on physical fitness and mental stress, also to correlate the physical fitness and mental stress. Results for the study shows that there is significant difference in physical fitness in both the groups. Physical fitness is more among the exercising group(mean:73.19533) than non-exercising group(mean:62.89067).This may be due to regular exercise due to which the oxygen consumption of the body increases and this results in increased physical fitness of the individual. Results of this study is similar to *Jyoti p.*

Khodnapur study in which they assessed physical fitness index(PFI%) and anthropometric parameters in residential school children compared to non-residential school children and concluded that physical fitness and anthropometric parameters are higher in residential than those of non-residential group. So, regular exercise and nutritious diet under the guidance increases the physical fitness and growth in growing children. Therefore regular exercise under the guidance can be undertaken as a part of curriculum to gift physically fit youth of the country.[8]

The body of the individuals exercising regularly gets adapted to heavy demand, so, in such individuals the PFI is more as compared to non-exercising individuals.

The other component, which is mental stress, shows that there is decrease in level of mental stress with regular exercise in exercising group(mean:13.66667) than non-exercising group(mean:16.86667)

When stress affects the brain, with its many nerve connections, the rest of the body feels the impact as well. Or, if your body feels better, so does your mind. Exercise and other physical activity produces endorphins- chemicals in the brain that act as natural painkiller and also improve the ability to sleep, which in turn reduces mental stress. Scientists have found that regular participation in aerobic exercise has been shown to decrease overall level of tension, elevates and stabilize mood, improve sleep and improve self-esteem. The correlation between Physical fitness and mental stress is very significant [correlation coefficient(r)=-0.5349, p value=0.0023], which is inversely proportional and moderate in strength. This shows that as the physical fitness increases, level of mental stress decreases.

5. Conclusion

The study was done to assess the physical fitness and level of mental stress in exercising and non-exercising individuals which showed better physical fitness and lower mental stress levels among exercising group than those of non-exercising group. Correlation between physical fitness and mental stress is very significant, moderate in strength and inversely proportional. This means that increase in physical fitness causes decrease in level of mental stress.

Future scope

Large sample size and incorporating exercise in daily life of middle aged people to get healthy body as well as healthy mind.

List of aberrations used:

PFI: Physical Fitness Index

PSS: Perceived Stress Scale

Exs: Exercising group

Nexs: Non-exercising group

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Figure 1: Modified Harvard step test(starting position)



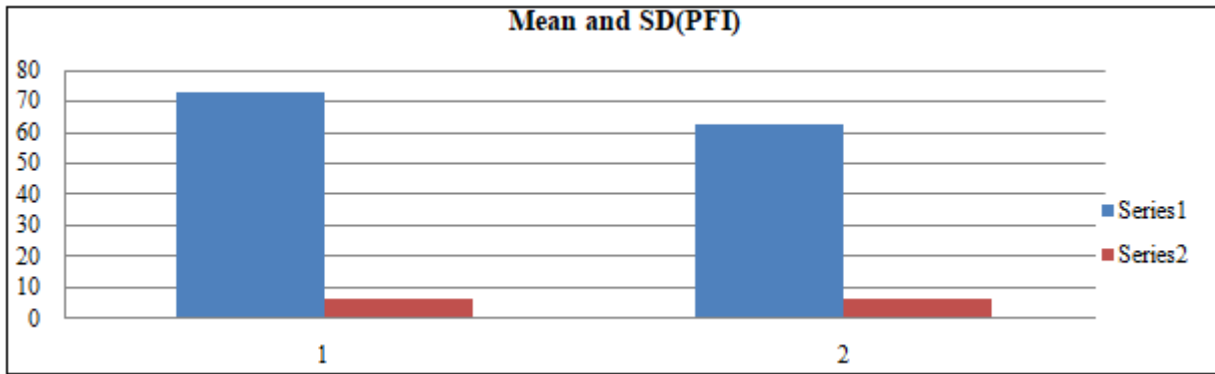
Figure 2: Modified Harvard step test(position 1)



Figure 3:Modified Harvard step test(position 2)

PERCEIVED STRESS SCALE					
The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by circling <i>how often</i> you felt or thought a certain way.					
Name _____					Date _____
Age _____	Gender (Circle):	M	F	Other _____	
0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often					
1. In the last month, how often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
2. In the last month, how often have you felt that you were unable to control the important things in your life?	0	1	2	3	4
3. In the last month, how often have you felt nervous and "stressed"?	0	1	2	3	4
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	0	1	2	3	4
5. In the last month, how often have you felt that things were going your way?	0	1	2	3	4
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	0	1	2	3	4
7. In the last month, how often have you been able to control irritations in your life?	0	1	2	3	4
8. In the last month, how often have you felt that you were on top of things?	0	1	2	3	4
9. In the last month, how often have you been angered because of things that were outside of your control?	0	1	2	3	4
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

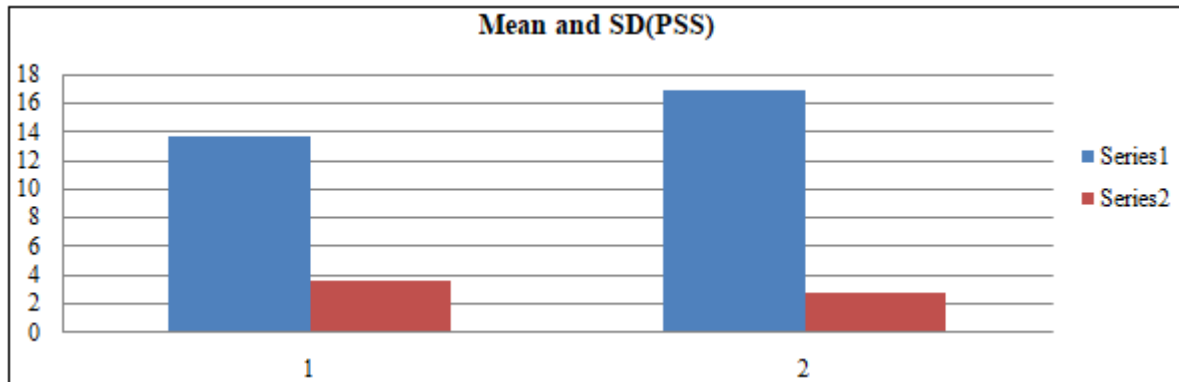
Scale 1



Graph 1: Comparing PFI between exercising and non-exercising groups.

Series1: mean

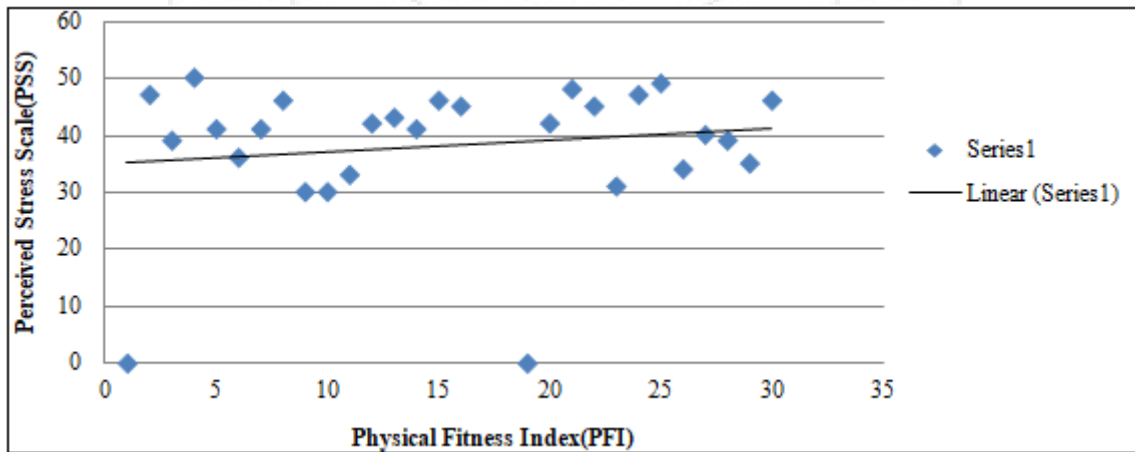
Series2: standard deviation



Graph 2: Comparing PSS between exercising and non-exercising groups.

Series1: mean

Series2: standard deviation



Graph 3: Correlation between Physical fitness index and Perceived stress scale