

## **Effect of One-Year Exercise Programme on Psychological State of Elderly People**

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### **Abstract**

Number of elderly people is increasing very fast than any other segment of our population. They face many problems due to various reasons. Their sufferings are intensified by fixed and reduced income, dispersal of children and fellow friends, and loss of social support. The purpose of this study was to observe the effect of one-year exercise programme on psychological state of elderly people.

Twenty male subjects in each of the three groups (Group-A:60-69 years, Group-B:50-59 years and Group-C:40-49 years) were the subjects of this study. Each group sub-divided into one experimental group (N=10) and one control group (N=10). All experimental groups (AE, BE & CE) underwent into individual specific exercise programme (50-70 min/session, 5 sessions/week for one year). Exercise programme consisted of suppling exercise, jogging/walking, stretching, and cool-down exercise. Control groups (AC, BC & CC) did not take part in any physical activity programme. Psychological state was measured by Anxiety (Spielberger's State-Trait anxiety Inventory, 1970) and Depression (Depression Scale – Karim & Tiwary, 1986). Pre- and post-tests were conducted before and after one- year experimental period. Intra- and inter-group comparisons (pre- and post-test data) were made by paired and independent t-test and level of significance was set at 0.05 level of confidence.

It was observed after that after one-year experimental period state anxiety and depression level reduced significantly ( $p < 0.05$ ) in all experimental groups and trait anxiety significantly reduced in AE & CE groups. And in control groups trait anxiety and depression of three groups and state anxiety of AC & CC increased significantly after one-year duration. Therefore it may be concluded that regular moderate physical exercise can reduce and maintain psychological state of elderly people.

**Key Words: Elderly People, Psychological State**

### **Introduction**

The number of elderly people is rising faster than any other segment of our population. In the elderly, changes - as a result of aging, have deleterious impacts upon bodily systems, those are likely to be: i) reduced capacity of respiratory system to take inadequate quantity of oxygen, ii) reduced efficiency of gastrointestinal system in extracting nutrition, iii) diminished output of the cardiovascular system, due to heart's decreased strength and/or hardening and shrinking of arteries iv) slowing and

reduced efficiency of urinary system at excreting toxins and other body waste (*Mahajan, 1997*). Decline in these functions, in turn, have severe repercussions on the psychosomatic and psychological performance (*Weg, 1983*).

The psychological problems faced by the elderly are complex and numerous. Three sources are account for the increase in major psychological problems; because older people can – i) become exposed to stress of poor health due to their reduced physical and mental functioning, ii) become exposed to economic stress due to

fixed and reduced income with which to meet rising medical expenses, and iii) loss social support because of the death of spouse and friends, dispersal of children due to their job and/or wedlock, and disengagement from social life (*Harba et al., 1997*). From middle age onwards a person confronts changes in the social environment and in his physical body, which require readjustment on his behavioural pattern. In the elderly, increase of the psychological problems like – low self-esteem, anxiety and depression are common. However, these problems can be tampered by the adequacy of the individual's social support. Friends, fellow workers, family members and neighbours can ease the burden. But if one is cut of from work, from children and from spouse, the changes of trauma increases manifold (*Chadha & Khuble, 1997*).

Due to various reasons as many as 25% of the elderly population suffers from mild to moderate depression, anxiety and other emotional disorders (*Sheperd et al., 1987*). Physical activity participation by older adults is associated with quality and quantity of life thus it reduces anxiety and depression; improves mood and feelings of well-being along with improvement at physical and mental levels (*Singer, 1992; Rikli, 2000*). Benefits of exercise are mainly tri-fold; it - i) promotes health ii) avoids disease, and iii) implies satisfaction with living (*Paffenberger et al., 1996*). Studies (*Blumemthal et al., 1989; Mossess et al., 1989; Emery & Gatz, 1990*) related to the effect of exercise, with its various form, intensity, and duration on to different group of people establishes that physical activity is a good intervention for psychological well-being of the elderly. But, there is a dearth of scientific study in

the area like effects of long-term exercise on the psychological state of the elderly people in our country. With this background, the present study was undertaken.

### **Materials and Method**

*Subjects:* Sixty male volunteers were assigned to three groups according to age. There were twenty male volunteers, in each of the three groups (Group-A: 60-69 years; Group-B: 50-59 years and Group-C: 40-49 years). Each group was again equally sub-divided at random into one experimental group (n=10) and one control group (n=10). Subjects were recruited from the vicinity of Kalyani University, Kalyani, West Bengal, India.

*Psychological State:* Psychological state of the subjects was measured through anxiety and depression; the most used two measures for predicting psychological state of a person (*Singer, 1992*). State-Trait Anxiety Inventory (*Spielberger et al., 1970*), commonly known as STAI was used for measuring state and trait anxiety. STAI is perhaps the most extensively used and highly regarded instrument for the assessment of state and trait anxiety in any area of psychological investigation (*Levitt, 1980*). STAI consists of separate self-report scales for measuring two distinct anxiety concepts: state anxiety and trait anxiety, each having twenty statements. The respondents are required to rate themselves on a four-point scale; 'not at all' to 'very much so' symptoms, which they experience. Depression was measured by depression scale (*Karim & Tiwari, 1986*). The scale is a self-report measure used to assess behavioral manifestations of depression. It contains 96 items, having five options for each item; "not at all" to "extremely" on various depression related symptoms,

which an individual experience. The level of depression of a volunteer was the percentile score obtained from summation of scores of the 96 items.

**Intervention:** The three experimental groups underwent in an exercise program of one-year duration (5 days/week). In the beginning, the exercise program for three groups was 45 - 55 min/session. And each exercise session consisted of suppling exercises and stretching of big muscles - 10 minutes, rest -2 minutes, brisk walking/jogging @ 1 km/10 min. - @1 km/15 min. for 20-30 minutes, rest -5 minutes and loosening and callisthenics – 5 minutes. After every three months the walking/jogging time was increased by 5 minutes and finally the duration of a session was 65 - 75 minutes.

**Design:** The duration of the study was one-year. Volunteers were tested twice, i.e., pre-test & post-test, one-year duration in between. Experimental groups followed exercise program specific to their age group and the load was increased after 3-month interval. And the control groups were used to perform their normal daily work. Random group design was used in this way.

**Data Analysis:** Data were analyzed using SPSS version 10.0. Mean and standard deviation were used as descriptive statistics for all groups. Independent t-test was used to predict inter-group difference and pair t-test was used to intra-group difference of scores in pre-and post-test. Level of significant difference was set at  $P < 0.05$  level.

**Results**

Table-1 shows the results of descriptive statistics by mean value and standard deviation of the state anxiety levels of the three age groups (both experimental and control groups). The

data reveal that the higher the age the higher is the level of state anxiety in the

Table – 1: Comparison of Pre- and Post-test Data of State Anxiety

Group	Pre Test		Post Test		t-value (Intra-group)	t-value (Inter-group)	
	Mean	±SD	Mean	±SD	Pre vs Post	Pre	Post
AE	44.73	7.68	38.45	6.39	4.281*		
AC	47.20	12.10	52.20	10.4	3.497*	0.528	3.426*
BE	36.33	3.92	32.22	2.82	3.426*		
BC	35.00	5.71	36.70	4.15	1.537	0.528	3.426*
CE	34.00	3.35	29.40	2.37	6.147*		
CC	32.40	4.74	34.70	4.88	3.997*	0.828	2.930*

\* Significant at 0.05 level

subjects of this study. Significant reduction ( $p < 0.05$ ) in state anxiety is observed in the three experimental groups during post-test. On the contrary, there is a significant increase of state anxiety levels of the two control groups (Group-A & Group-C) during post-test. Data of this study also reveal that there is no difference in state anxiety level between experimental and control groups of the three age category during pre-test. But, significant change is observed in the state anxiety level of experimental and control subjects after the end of one-year experimental period.

Table – 2: Comparison of Pre- and Post-test Data of Trait Anxiety

Group	Pre Test		Post Test		t-value (Intra-group)	t-value (Inter-group)	
	Mean	SD	Mean	SD	Pre vs Post	Pre	Post
AE	42.55	7.61	48.18	7.72	6.690*		
AC	49.30	9.56	51.6	8.83	3.735*	0.279	2.381*
BE	39.22	5.29	36.11	3.21	1.921		
BC	40.90	3.42	43.00	3.55	5.547*	0.777	4.200*
CE	38.50	4.84	34.00	3.82	7.997*		
CC	38.60	7.47	40.60	7.23	3.354*	0.034	2.422

\* Significant at 0.05 level

The data of Table-2, as shown by mean values, reveal that there is a tendency of high level of trait anxiety according to increased age category of the subjects. Reduction in trait anxiety level, after one-year experimental period, is observed in the three experimental

groups, and it is significantly reduced ( $P<0.05$ ) in experimental Group-A and Group-C. However, in all the three control groups, significant increase of trait anxiety observed during post-test. It is also observed that there is no significant difference between experimental and control groups' trait anxiety during pre-test, but significant difference persists in trait anxiety level in three groups during post-test. Because, during this period experimental subjects' trait anxiety level reduced significantly and in the three control groups it increased significantly after one-year period.

Table – 3: Comparison of Pre- and Post-test Data of Depression

Group	Pre Test		Post Test		t-value (Intra-group) Pre vs Post	t-value (Inter-group)	
	Mean	SD	Mean	SD		Pre	Post
AE	45.6	8.74	36.31	11.96	5.101*	1.269	3.115*
AC	52.67	14.49	56.13	15.36	3.342*		
BE	33.74	7.67	25.27	8.45	8.682*	1.444	0.56
BC	27.64	7.44	31.01	7.37	3.714*		
CE	33.23	11.78	25.86	12.16	9.942*	1.661	1.483
CC	25.23	11.71	28.95	11.13	2.725*		

\* Significant at 0.05 level

Table 3 shows (mean values) that the level of depression is higher in accordance with the higher age of the subjects of this study. Comparing pre-and post-test data it is observed that there is a significant reduction in depression in all the three experimental groups. On the contrary, significant increase is observed in depression level of the three control groups at post-test. Data also reveal that there is no difference in depression level of experimental and control subjects, during pre-test in any age category. However, there is a significant difference in depression level of experimental and control group of Group-A (in senior citizens) during post-test. But, in younger two groups there is no difference between

experimental and control groups even during post-test.

### Discussion

In the present study, considerably lower level of anxiety is observed in the persons who took part in the exercise program of one-year duration. On the other hand, those who remained sedentary during that one-year duration, they have increased their anxiety levels. Similar results are observed in the studies of leading researchers (*Shephard, 1978; Morgan & Goldston, 1987*) who conducted research to observe the effects of exercise on anxiety levels of different population and reveal the notion that exercise, either acute or chronic, can reduce anxiety level. There are extensive studies (*Shephard et al., 1987; Blumenthal et al., 10; Mossess et al., 1989*) on exercise and anxiety. Similarly, studies (*Singer, 1992; Koenig & Blazer, 1996*) also recommend that physical activity is beneficial for reduction of depression among elderly.

When anxiety is considered as one of the measures of psychological well-being of the senior citizens, it is observed that after a 12-week exercise training program anxiety level reduced significantly and improved quality of life. On the contrary, among non-participants, anxiety levels remain unchanged. This phenomenon also reveals that there is a positive effect of aerobic exercise on mood state and anxiety level of normal individuals (*Steptoe & Bulton, 1988*). It is also observed that exercise can help to reduce the anxiety levels of special group of older adults (*Schwab et al., 1985*) and of young adults (*Ekkekakis et al., 1999*).

In this study change in the depression levels of the experimental and

control groups are observed at the end of one-year experimental period, when experimental groups reduce significantly and control groups increase significantly in their depression level. However, both in the pre-or post-test, there is no difference in depression level between experimental and control subjects of Group-B and Group-C. It is to mention that though there is no difference in depression level of experimental and control groups of 60<sup>+</sup> age category during pre-test, but it is significantly differs after one-year experimental period. Depression level of Group-A group i.e., senior citizen group, is high than other two groups. It is observed that depression becomes peak in the teens and it drops off with age until the 60s and then increases remarkably with old age (*Miroswky & Ross, 1992*). This trend is also obtained from the findings of the present study, where a huge difference is observed in depression of below 60-year and above 60-year age groups, either in control and experimental groups. Higher depression in the elderly is mainly due to three reasons – i) economic stress, ii) loss of social support, and iii) poor health (*Harba et al., 1997*).

Depression in the elderly has a wider rang of genetic, psychosocial and acquired biological determinants (*Koenig & Blazer, 1996*). Studies on depressed persons have revealed that aerobic exercises are as effective as different forms of psycho-therapy, and that exercises have anti-depressive effect on patients with mild to moderate forms of depression. It is also found that physical activity is more beneficial than recreational activities for all variety of depressive disorders (*Singer, 1992*). Studies on the effectiveness of aerobic exercise on depressed persons are quite

limited (*Singer, 1992*). However, there are a few studies (*Blumenthal et al., 1989; Emery & Gatz, 1990*) those are very similar to the present study shows some improvement in psychological state of the elderly adults by reducing their depression level through aerobic exercises.

It is observed that as many as 25% of the population suffers from mild to moderate depression, anxiety, or any other psychological disorders. Some could cope with these disorders individually without professional assistance. However, physical activity can be a promising aid for such people (*Bouchard et al., 1990*). Extensive review on psychological benefits of physical activity reveals that exercise can – i) help reduce state and trait anxiety, ii) help decrease the level of mild to moderate depression, iii) be an adjunct to professional treatment of psychological disorders (*Singer, 1992*). There is also strong evidence in support of the present study that physical activity of chronic in nature is capable of reducing depression in moderately depressed individuals. And both of short-term and long-term exercise can improve elderly adults' psychological state and mental well-being (*Morgan & Goldston, 1987*).

### *Conclusion*

Though present study has some limitations i.e., we did not consider the socio-economic status of the subjects, yet, on the basis of the findings of related study, the following specific conclusions are drawn.

1. Anxiety and depression levels of experimental groups reduced significantly (except trait anxiety of Group-BE) and those psychological

states were increased in control groups (except state anxiety of Group-BC) after the one-year experimental period.

2. In the beginning of the study there was no difference between experimental and control subjects,

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