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Effects of Exercise on Levels of Depression

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ABSTRACT The aim of this study was to investigate the effect of exercise on depression levels. Beck Depression Inventory (BDI) was applied to a total of 605 subjects at different exercise levels. The BDI score of non-exercising group was 13.18, while the average score of those who exercise was found to be 8.93. Non-exercising group showed higher depressive symptoms than the exercising group. Gender had no significant difference on the levels of depression ($p>.05$). Non-exercising group was found to be more depressive than the exercising group ($p<.01$). It was observed that exercising resulted in a low level of depression and the level of depression was reduced as the exercise time was increased. It can be said that exercise had a positive effect on reducing depression. People should be motivated and encouraged for having the habit of regular exercise to improve the quality of life.

INTRODUCTION

Sedentary life style is more common in both the developed and developing countries. The interest in understanding the effect of sedentary lifestyle on depression has been increasing (Arrerondo et al. 2012). Besides, a sedentary lifestyle increases the psychological factors such as feeling of hopelessness and depression (Valtonen et al. 2010). Some researcher studied the relationship between the sedentary lifestyle and mental health, especially the risk of depression (Teychenne et al. 2010) and it was assumed that depression would be a global disaster by the year 2020 (Mathers and Loncar 2006) and would affect more than 340 million people worldwide. The reason of that was thought to be related to the increase in the sedentary behaviors of the young adults (Brunet et al. 2014).

Depression has a significant impact in reducing physical health and quality of life. Studies showed that pharmacological and psychological treatments will be effective in treating depression but some people chose alternative treatments such as doing exercise (Cooney et al. 2014). Many recent studies proved that exercise which was carried along with the conventional treatments had an effective role on reducing depression (Stanton and Reaburn 2014) and some other studies reported that the symptoms of depression were reduced by doing exercise (Dunn et al. 2005). The somatic symptoms of depression are changes in appetite and sleep pattern, lack of sleep (Brunet et al. 2014), feeling of sorrow, unhappiness, reluctance, pessimism and feeling guilty (Saygin et al. 2011).

A physically active lifestyle contributes to mental health (Penedo and Dahn 2005) and epidemiological studies (according to clinical guidelines) assumed that adequate physical activity is associated with less depressive symptoms (Sarris et al. 2014).

The aim of the current study was to investigate the effects of exercise among women and men who did exercise for health at different levels.

METHODOLOGY

The Research Group

The research group was consisted of 136 sedentary (41 female, 95 male) and 469 active (189 female, 280 male) adults who were aged 18-45 and lived in the city center of Samsun, Turkey. The active group did cycling, walking, running, jogging, swimming, weight lifting etc.

Data Collection

All the participants were asked to join in the research voluntarily and once the volunteers were informed about the scope and the method of the study, a socio-demographic questionnaire

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and the Beck Depression Inventory (BDI) were administered.

Beck Depression Inventory (BDI)

It was developed by Beck in 1961 to measure the risk of depression and the symptoms of depression in adults. It was a self-report questionnaire that included 21 category and the highest possible score was 63. The total score indicated the severity of depression. The inventory was developed by Beck et al. (1961) and the validity and reliability study for Turkish people was conducted by Hisli (1989). In the Beck inventory scale, a score of 0-9 points were reported as minimal depressive symptoms, 10 to 16 points as mild depressive symptoms, 17 to 29 points as middle depressive symptoms and 30 to 63 points were reported as severe depressive symptoms.

Statistical Analysis

SPSS 17.0 (SPSS Inc. Released 2008. SPSS Statistics for Windows, Version 17.0. Chicago: SPSS Inc.) statistical software was used. Descriptive statistics, the arithmetic mean and standard deviation were given. Independent t-test was used to determine the statistical differences, one-way ANOVA, Tukey post-hoc test, and chi-square tests were used.

RESULTS

Regardless of gender, Beck depression scores of the sedentary was 13.18 whereas the active group scored 8.93 as shown on Table 1.

Table 1: Beck depression inventory mean scores of active and sedentary subjects

Variables	*N*	*Mean*	*Std. error*	*t*
Sedentary	136	13.18	.94	5.72*
Active	469	8.93	.29	

*$p<.01$

Table 2 showed that female subjects' scores were different at all levels but none of these differences was statistically significant (p>.05). In contrast, male subjects showed statistically significant depression scores (p<.01) and sedentary males' depression scores were pretty higher than those who were active.

As shown on Table 3, 49.1 percent of the subjects were minimally depressed, while 38.7 percent of the subjects had a mild depression level. The percentage of the attendants who were depressed above mild depression was just above 11 percent. There was no significant difference among the levels of depression by gender (p>.05).

Table 2: Depression scores of the subjects classified by activity levels

Variables	*Female*		*Male*		*Total*	
Activity Hours Per Week	*n*	*Mean*	*n*	*Mean*	*n*	*Mean*
Sedentary (1)	41	10.93	95	14.15	136	13.18
1-3 hours (2)	122	9.59	145	9.91	267	9.76
4 hours or more (3)	67	8.22	135	7.64	202	7.84
Total	230	9.43	375	10.17	605	9.89
Difference	*F*:2.24		*F*: 18.03** Tukey: 1>2, 3		*F*: 20.46** Tukey: 1>2, 3; 2>3	

**$p<.01$

Table 3: Comparison of the depression scores of the subjects classified by gender

Variables	*Female*		*Male*		*Total*	
Level of depression	*n*	*%*	*n*	*%*	*n*	*%*
Minimal	113	49.1	184	49.1	297	49.1
Mild	96	41.7	138	36.8	234	38.7
Middle	16	7.0	42	11.2	58	9.6
High	5	2.2	11	2.9	16	2.6
Total	230	100	375	100	605	100

$\div^2 = 3.89$ $p>.27$

The participants spent time on exercise at different levels or not spent at all. The distribution of time spent on exercise was as follows: sedentary 22.48 percent, 1-3 hours per week 44.13 percent and 4 or more hours per week 33.39 percent (Table 4). The majority of the minimally depressed group (43.43%) was the group that exercised mostly (4 or more hours per week). The subjects who did exercise for 1-3 hours per week had the largest portion in mildly depressed column (51.71%). Sedentary people were seen to be the most depressed group (68.75%).

DISCUSSION

Exercise has been advocated for the treatment of depression and has been the subject of research for many years. It was argued that exercise was necessary to improve depressive symptoms of who were diagnosed as depressed but further research was needed (Rimer et al. 2012). Anxiety and depressive disorders are major public health problems. In the prevention of these diseases, changing the lifestyles, such as doing physical exercise may have a great potential in the success of the treatment. There is evidence that physically active people reduced the risk of developing depression (Martinsen 2008).

In general, the point prevalence of depressive symptoms in the community ranged between 13-20 percent (Ozturk 1997). In their study, Ozyurt and Deveci (2011) found the prevalence of depression of the housewives, aged 15-49, as 14.7 percent. Aylaz et al. (2007) found that the average BDI score was 10.84±9.39. In another study, the average depression scores of the university students were determined to be between 12.00 and 13.65 (Ozsaker 2013). In their meta-analysis study, Luppa et al. (2012) reported that the depression prevalence in major depression was 7.2 percent and 17.2 percent in depressive diseases in the elderly people. The relationship between socio-economic status and depression is most evident in Bulgaria and Hungary. It was stated that the depression variance in Bulgarian men was about 15 percent and 5 percent in Bulgarian women (Van de Velde et al. 2010).

In this study, the average BDI score of sedentary people was 13.18, while those who do exercise scored 8.93. This result, low BDI scores of the active people, supported the hypothesis that exercise was effective in decreasing the symptoms of depression.

Depression is a common disorder that approximately 5-13 percent of women and 2-8 percent men suffered (Oh et al. 2013). Rajala et al. (1994) investigated the frequency of depression in Finnish elderly (aged 55) and reported that women were more depressive than men (12.1 percent and 6.8, respectively). The reason for this was thought to be that the women became less active in adulthood when compared to their male counterparts and some of the previous longitudinal and cross-sectional studies on the effects of aging on depression support this hypothesis (Azar et al. 2008)

In this study, the average depression score of sedentary females was 10.93 while the score of males was 14.15. Regardless of gender, the average depression score of the sedentary people was 13.18 whereas active people scored much lower scores as the activity period extended: 9.76 for those who do exercise 1-3 hours/week and 7.84 for those who do exercise 4+ hours/week (Table 2). Depression levels of women who were sedentary and who were active, was different but this difference was not statistically significant ($p>.05$). In contrast, active men scored less than sedentary males ($p<.01$). Regardless of gender, depression score of the sedentary people was higher than the active people. There was also a statistically significant difference between the scores of those who do exercise 1-3 hours/ week and those who do exercise 4+ hours/week

Table 4: Comparison of depression scores classified by the time spent on exercise

Variables	*Minimally depressed*		*Mildly depressed*		*Middle depressed*		*Highly depressed*	
Activity hours per week	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Sedentary	50	16.84	54	23.08	21	36.21	11	68.75
1-3 hours	118	39.73	121	51.71	24	41.38	4	25.00
4 hours or more	129	43.43	59	25.21	13	22.41	1	6.25
Total	297	100.00	234	100.00	58	100.00	16	100.00

$\div^2 = 49.40^{**}$ $^{**}p<.01$

($p<.01$). The higher scores of the sedentary males may be due to the negative effects of sedentary lifestyle on depression. It might be told that the observed depression level was low in general because the majority of the subjects were active people. It can be said that as people do exercise more, the depression scores are likely to decrease.

In their study, Steptoe et al. (1997) found that the correlation between exercise and depression in 16,483 university students was low. Similar results were also found in some studies. In their original studies, Weyerer (1992), Stephens (1988) and Salmon (2001) were found that being active at a recreational level reduced the symptoms of depression and anxiety and it was concluded that physical activity promoted mental health as well as physical health.

Ozdel et al. (2002) reported that the mean BDI score of male and female students at the university was 12.80±7.19 and found no relationship between depression and gender. In the recent study, the researchers found that the percentage of the minimally depressed was 49.1 percent and mildly depressed was 38.7 percent. The total percentage of middle and high level of depression was very small (12.2%). There was no significant difference between levels of depression ($p>.05$) between genders.

Moderate exercise is faster than an effective control intervention in reducing depression symptoms (Cooney et al. 2014). Earlier reviews recommend both aerobic and anaerobic exercises to alleviate symptoms of depression (Stathopoulou et al. 2006; Azar et al. 2008). The physiological benefits, besides its psychological benefits, of exercise on a regular basis were mentioned in the literature. These benefits included, reduced depression (Folkins and Sime 1981; Byrne and Byrne 1993), anxiety (Cameron and Hudson 1986) and anger (Buchman et al. 1991) and improved mood (Thirlaway and Benton 1992; Hassme' n et al. 2000). Singh et al. (2005) applied two types of resistance programs to older adults (aged over 60). One of the programs had an intensity of 80 percent and the other had an intensity of 20 percent. The program lasted for 8 weeks. At the end of the study high-intensity resistance training program was found to be more effective than the low-intensity program in reducing the symptoms of depression. In another study, an 8-month exercise program applied to 40 to 60-year-old depressed women and it was found that exercise was more successful than pharmacological treatment in decreasing the symptoms of depression (Carta et al. 2008).

CONCLUSION

In this research, it was found that 22.48 percent of the attendants were sedentary people, 44.13 percent were doing exercise 1-3 hours/week and 33.39 percent were doing exercise 4 or more hours per week. Minimally depressed subjects were found to be the ones who did exercise for 4 or more hours weekly. The majority of the subjects with mild and moderate depression did exercise between 1-3 hours weekly (51.71% and 41.38%, respectively), while the majority of depressive patients (68.75%) were sedentary people.

In this study, it was found that the exercising groups showed low levels of depressive symptoms and the symptoms were far reduced as the exercising hours exceeded 3 hours per week. These results and the literature suggested that there was a connection between exercising frequency and depressive symptoms and the depressive symptoms could be reduced by doing regular exercise.

As a result, it was observed that as the duration of weekly exercise increased, the levels of depression tended to fall. It can be told that exercise had a positive impact on reducing depression levels. To reduce the levels of depression and to improve the quality of life of people, the habit of doing exercise regularly should be encouraged among sedentary people.

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