

## THE ROLE OF IMPROVED PHYSICAL FITNESS IN REHABILITATION AND RECOVERY

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*In a study examining the efficacy of an aerobic exercise program for adults with chronic psychiatric disabilities, the hypothesis that certain aspects of psychological well being would improve as fitness levels increased was tested. Using a quasi-experimental non-equivalent control group design, 37 adults with severe psychiatric disabilities participated in a structured aerobic exercise program that met three times a week for 30 minutes over 15–20 weeks. Psychological and physiological assessments occurred at five different, but equal, points in time. Upon completion of the exercise phase, individuals participated in a follow-up period matching the exercise phase in duration. Significant positive changes were seen in both physical and psychological variables, indicating the potential of physical fitness as a rehabilitation intervention for persons with a psychiatric disability.*

A growing body of research suggests that persons with psychiatric disabilities are at higher risk for health-related problems, which increase the physical, emotional, and social difficulties they may experience. Over the last decade a number of investigators have described the high co-morbidity and mortality rates in persons with chronic psychiatric disability (Bartsch, Shern, Feinberg, Fuller, & Willett, 1990; Berren et al., 1994; Koran, et al., 1989; & Leff,

1996). People with psychiatric disabilities are living with and dying from serious physical diseases that are directly linked to levels of physical activity including cardiovascular disease, obesity, hypertension, and diabetes (Vieweg, 1995). Ironically, embedded in the philosophy of psychiatric rehabilitation is the idea that the physical, emotional and intellectual dimensions of a person are critical to healthy living (Carkhuff, 1969). Despite this and the emerging

trend in the research, mental health professionals often do not recognize the importance of improved physical fitness as an essential component in treatment, rehabilitation, and recovery. There has been very little support on the system or program levels for the development and implementation of strategies and services aimed at improving the physical well-being of persons with psychiatric disabilities. This is alarming given the data that cites rates of serious physical illness as high as 60% and a mortality rate 2.5 times higher than the general public (Berren et al, 1994; Hutchinson, 1996; & Leff, 1996). The realities of poor health constitute serious barriers to people's participation in other treatment modalities and in their rehabilitation and recovery (Hutchinson, 1996; Massaro, 1992; Spaniol, Koehler & Hutchinson, 1994).

Increasing physical fitness is one strategy suggested as an effective intervention to help people with psychiatric disabilities manage symptoms more effectively and increase the overall quality of their lives. Plante and Rodin (1990) reviewed a decade of research on exercise and mental disability and found that the data consistently suggest that increased physical fitness has a positive impact upon persons with severe psychiatric disabilities. Exercise improves mood, psychological well-being, self-concept, self-esteem, and some work-related behaviors. In Plante's (1996) more recent review of the research, he reported that exercise programs for persons with psychiatric disturbances also led to decreases in depression, anxiety, and stress. Yet many of the studies reviewed have not included people who meet DSM-IV criteria (APA, 1994). Other studies by Martinsen (1988), Pelham and Campagna (1991) and Flannery, Penk and Addo (1992) have found that improved fitness plays a significant role in the rehabilitation process by reducing stress, increasing self-esteem, restor-

ing reasonable mastery, and resolving learned helplessness.

This research study evaluated the impact of an exercise training program upon persons with severe psychiatric disabilities who met DSM-IV criteria. This paper reports the benefits for persons with severe psychiatric disabilities resulting from regular exercise over a sustained period of time as a component of rehabilitation and recovery.

## METHOD

### Research Design

Two research designs were used to examine the efficacy of the interventions. The first design utilized was a modified time series design where a total of 56 persons were recruited for the study in sequential groups of 10–12 people. A 15–20 week structured exercise program was the initial intervention, and the secondary intervention was individualized support offered after the first phase of the study was completed. Assessment of the dependent variables (physiological and psychological) occurred at five different, but equal, points in time. The second research design implemented was a modified pre-test/post-test control group design where participants were randomly assigned into a support or non-support intervention at completion of the 15–20 week structured exercise program. The goal of this dimension of the study was to determine the amount of intervention necessary to help participants maintain physical and psychological gains once the structured exercise intervention was completed.

### Research Participants

Fifty-six people were recruited and enrolled in five groups during the course of the study. All were volunteers who were also participating in vocational rehabilitation services. Fifteen persons

withdrew from the study because of work, school conflicts, crises, or injuries unrelated to the research. A comparison group ( $n = 6$ ) was recruited from the same pool of potential participants as the experimental group. Thirty-seven adults with diagnosis of major psychiatric disability meeting the criteria of DSM-IV (APA, 1994) participated in the research study. The six individuals from the comparison group, also participating in vocational rehabilitation services, did not receive any interventions but were evaluated during the testing sessions.

### Interventions

The goal of the study was to examine the efficacy of an aerobic exercise program for adults with severe psychiatric disabilities in producing changes in cardiovascular fitness and selected psychological parameters. People participating in the exercise class met three times a week for an hour in the early afternoon. Program duration varied according to group membership; Groups 1–3 met for 20 weeks and Groups 4–5 met for 15 weeks. The training took place in one quarter of a gymnasium (separated by moveable walls) and an adjacent fitness room which contained bicycle ergometers, rowing machines and stairmasters. The class began with a warm-up period where the participants recorded their resting heart rate and were encouraged to do light stretching. Training proceeded with the people participating progressing from 10 to 15 minutes of exercise during the first week to a maximum of 30 minutes. People chose the mode of exercise they were most comfortable with during each class. The options included the cycle ergometer, stairmaster, rowing machines, and jogging/walking. During this 30 minute period, students and instructors periodically checked exercising heart rates to ensure that each person was exercising within his or her individual target heart rate range, which

was based on the initial evaluation. After the aerobic exercise portion of the class, students cooled down and recorded the activities, comments, and feelings in their journals.

The participants received lockers, exercise clothing, and water bottles as a method to maintain and encourage attendance. Instructors encouraged adequate fluid intake to avoid exercise and medication interactions (i.e., dehydration). In addition to the 3 days of class, students were encouraged to exercise a fourth day on their own. The staff members included two exercise science graduate students, who provided instruction regarding the exercise component, and two rehabilitation counselors. The relationships between staff members and research participants were similar to those of teacher and students.

When the exercise training was completed, the participants were randomly assigned into one of two groups, support (S) and non-support (NS) for a 15- to 20-week follow-up period. People were asked to exercise on their own utilizing the skills they had learned in class to monitor the intensity of their exercise. The rehabilitation counselors contacted the S group weekly to encourage continuation of exercise and to offer accompaniment. The study also provided individuals with activity cards which gave them unlimited access to the university's fitness facilities. The participants in the NS group were contacted only to set appointments for follow-up testing sessions.

### **Data Collection**

*Method.* The collection of physiological and psychological data occurred at five different but equal points in time. For the first three groups of people, assessments occurred every 10 weeks and, with the last two groups of people, assessments occurred every 7 to 8 weeks. This change in duration of the training program (20 weeks to 15 weeks) was

implemented when analysis of the data revealed a significant reduction in attendance during weeks 15–20 of the program. Data collection on both levels, physiological and psychological, occurred on the same day. Once self-report inventories were completed, a cardiologist evaluated and tested participants on a motorized treadmill (first three groups) and on an electrically braked ergometer (last two groups). This change in testing modality was implemented because of the extreme anxiety people associated with the treadmill. As this discomfort appeared to have a negative effect upon performance time, a shift to a bicycle ergometer was initiated in hopes of producing more reliable results. The assessments occurred early in the morning, and snacks were served to participants once the testing was completed. We provided written feedback to the people participating about their physiological status after each testing session.

### **Physiological Assessments**

Prior to administration of the physiological evaluations, we conducted orientation sessions to familiarize each person with the equipment to minimize the anxiety associated with this type of testing. All the participants received an initial physical from a cardiologist prior to the fitness evaluation and exercise tolerance test (ETT). An ETT measures the ability of a person to perform physical exercise during progressively increasing exercise intensity. The duration of the performance estimates a person's cardiovascular fitness and is frequently used with adults and various patient groups. In addition to the ETT, other assessments included: height and weight, resting and exercise blood pressure, heart rate, total body fat estimated from various skinfold measurements by a skinfold caliper (the Lange Skinfold Caliper, from Cambridge Scientific Industries, Cambridge, Maryland), and a blood lipid profile (cholesterol,

triglycerides, high and low density lipoproteins, and glucose) determined from various blood samples taken before the ETT.

### **Psychological Assessments**

Widely applied and accepted self-reporting psychological assessment tools were used to measure any mental health changes that occurred during the course of the research study. All instruments were administered at five different points in time concurrently with the physiological assessments.

The Tennessee Self-Concept Scale (TSCS) (Fitts, 1964) was used to measure change in self-concept. The TSCS provides an overall index of the individual's perceived self-worth and self-esteem and also measures five subscales of self-concept. For the purposes of this study, we used the clinical and research form (normed on people with psychiatric diagnosis) of the TSCS.

The Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) was used to measure each participant's level of depression. The Katz Adjustment Scale (Katz & Lyerly, 1963) was used to assess social activities that in turn relate to social adjustment factors. Relevant to this study were the forms S2 (level of performance of socially expected activities) and S3 (level of expectations for performance of social activities) which consist of items describing family and social responsibilities, social activities, self-care, home adjustment, and community activities.

## RESULTS

We analyzed the data on 37 participants. The attrition rate averaged approximately 20%, with each group losing 2–3 people. Reasons stated by these participants included work and/or school conflicts, medical reasons, and lack of emotional readiness. People

**Table 1—Demographic Data**

VARIABLE	EXPERIMENTAL (N=37)	COMPARISON (N=6)
Age (mean +/- <i>sd</i> )	31 ± 5.4	36 ± 5.4
Women	43%	50%
Men	57%	50%
College Graduate	19%	50%
Some College	62%	50%
High School Graduate	78%	100%
Psychotropic Medications	80%	82%

who remained in the study received outreach and support from the staff to encourage and maximize their participation. Attendance for groups 1–3 over the 20 weeks averaged 61%, while for groups 4 and 5 averaged 60% for 15 weeks. Table 1 provides basic demographic data on the exercise and the comparison groups. Eighty percent of the people were taking psychotropic medications at the time of the study, which was supported by the reported diagnostic categories: 37% bi-polar disorders, 30% schizophrenia, and 33% personality disorders. The group was fairly young ( $X = 31$  years) and well educated, with almost two thirds reporting some college experiences. More men (57%) than women (43%) volunteered to participate.

Repeated measures ANOVA's were used to examine the impact of the intervention on the psychological and physiological variables. Results indicate that as people exercised over time, their overall self-esteem rose significantly. Sub-scores also indicated that their self-esteem in relationship to their family also was significantly improved.

Exercise also had a significant anti-depressant effect upon the people participating over time. Though statistically non-significant, the participants reported increases in their daily activities of living, improved satisfaction with level

of activity, and improved self-esteem in regards to their physical self, their behavior, and their moral self.

Performance times on the ETT improved significantly, suggesting improved cardiovascular fitness as a result of the structured exercise intervention. Exercise times, however, decreased once the class was completed. Percent body fat, weight, blood lipids, and cholesterol did not change significantly over the course of the study. The comparison group of people exhibited no significant changes on any of the dependent variables.

## DISCUSSION

The results of this research indicate that when people with differing diagnoses of severe mental illness exercise regularly, they experience significant improvements in depression, self-esteem, mood, and fitness levels. These results may seem unsurprising, especially given that the effects of regular physical exercise are well documented with regards to cardiovascular and psychosocial health in the general population. However, there is a lack of sound research studying the impact and benefits of sustained exercise for persons who meet the diagnostic criteria for a severe psychiatric disability.

Analyses were performed to examine whether the presence of support in the form of encouragement, phone calls, and accompaniment to the gym by a rehabilitation counselor would make a difference in the subjects' adherence to their exercise program once the structured class was over. No significant differences occurred between those people who did receive counselor support (S) and those people who did not receive support (NS) on any of the dependent variables. The lack of significance between the group receiving support and the group that did not receive support is contradictory to the anticipated outcomes and the general knowledge in a field where support is critical to rehabilitation and recovery. This may be due, in part, to the non-standardization of the support intervention. The lack of non-random assignment into the exercise and comparison groups, the small number of people in the comparison group, and the lack of control around the interplay between medications and exercise present a degree of uncertainty about the inferences drawn from the data. Though these limitations do not preclude meaningful interpretations and understanding of the results, there is a need for further systematic research examining fitness as a rehabilitation intervention, which may facilitate the recovery of people with psychiatric disabilities.

This study suggests that improving physical fitness can contribute positively to both the rehabilitation and recovery from severe mental disability by not only improving physical health but by strengthening people's sense of confidence, competence, and control over their bodies and their lives. Providing opportunities for persons with mental disability to improve their physical fitness is one effective way that rehabilitation programs and professionals can be involved in nurturing the recovery

process. Furthermore, the development and implementation of fitness and wellness interventions may become increasingly important and helpful in behavioral managed care environments, where more self-help and health promotion/illness prevention interventions are emphasized.

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