

# The Affects of a Single Bout of Exercise on Mood and Self-Esteem in Clinically Diagnosed Mental Health Patients

Naomi J. Ellis, Jason A. Randall\*, Grant Punnett

Centre of Sport, Health and Exercise Research, Faculty of Health Sciences,  
Staffordshire University, Staffordshire, UK  
Email: \*j.a.randall@staffs.ac.uk

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## ABSTRACT

**Objectives:** Research has highlighted the importance of regular exercise within the general population and mental health groups in regard to mood and self-esteem, as well as single bout exercise within the general population. However, research into single bout exercise in mental health population is lacking. This study investigated the impact of a single bout of exercise, on mood and self-esteem, in patients with a wider clinical mental health diagnosis. **Design:** A quantitative questionnaire was completed immediately pre and post a single, 45 minute bout of moderate intensity exercise, consisting of the Brunel Universal Mood States (BRUMS) questionnaire and the Rosenberg Self Esteem Scale (RSE). **Methods:** Participants attending a mental health hospital with a clinical mental health diagnosis (N = 54) completed the questionnaire. Information regarding physical activity levels, mental health diagnosis and length of hospital stay were collated. **Results:** A significant improvement was identified on the RSE as well as the BRUMS (depression, anger, confusion, anxious tension and vigour) over time. **Conclusion:** The significant findings highlight the importance of exercise promotion within this population group, and the potentially beneficial role that a single bout of exercise can have on mood and self-esteem in patients experiencing mental health problems.

**Keywords:** Clinical; Exercise; Health; Mental Health; Mood; Self-Esteem

## 1. Introduction

Mental health is currently at the forefront of government policy and is receiving ever increasing interest from researchers, the general public and policy makers [1]. The most recent figures suggest that in the UK 1 in 4 people report at least one diagnosable mental health condition during their lifetime [2,3] costing the UK an estimated £77 billion in 2002/03 [3,4].

There is a growing recognition surrounding the mental health benefits of regular physical activity in the general population [5]. Research suggests it can reduce stress, [5,6] anxiety [7] and depression [8] whilst improving mood [5,9,10]. A number of reviews have explored psychological outcomes and regular exercise within the general population [9-11]. Findings suggest that regular exercise improves various psychological characteristics (e.g., mood). Whilst regular exercise appears to be preferable, it is not always practical. Research indicates that a

single bout of exercise can enhance mood and well-being in the general population [9,12-15]. This highlights potential benefits for groups where attrition is high or attendance to multiple bouts is difficult, such as some clinical mental health populations [16].

Research into regular exercise and psychological benefits within mental health populations is by no means lacking and has further strengthened our understanding of the relationship between mental health and exercise [17-19]. There are a variety of recent reviews and meta-analyses on anxiety [20,21], depression [22,20] and psychosis [23] highlighting the relationship between exercise and psychological benefits within these populations.

Research specifically investigating the effect of a single bout of exercise with individuals experiencing mental health difficulties is limited [24,25]. Significant improvements in psychological outcomes were reported in people with depressive disorders [24-26]. Similar findings were also reported by Weinstein [25], although these reductions in depressive symptoms were not maintained

\*Corresponding author.

over time (one hour post).

Given that evidence suggests a single bout of exercise can promote a change in mood and self-esteem within the general population [14], and in individuals with depression [24], the potential of such immediate benefits in mental health population groups, in whom the need is often greatest, warrants further investigation. Therefore, the aim of this research is to examine whether a single bout of exercise has an effect on mood and self-esteem in clinically diagnosed patients experiencing a range mental health problems.

## 2. Method

### 2.1. Participants

A total of 65 participants, 45 males (69.2%) and 20 females (30.8%), engaged with the research consisting of 40 (61.5%) inpatients, 22 (35.5%) outpatients and 3 (4.6%) who did not specify. Overall 59 (90.8%) described themselves as white British, 2 (3.2%) as black British, 1 (1.5%) as “other” with 3 (4.6%) not disclosing. The mean age was 44.6 (SD = 11.7) years, minimum 19 years and maximum 70 years. Length of inpatient stay varied from 2 days to 2 years 9 months, with a mean stay of 59.22 (SD = 204.01) days. The primary diagnosis, based on staff information, was anxiety (52.3%), with additional diagnoses of depression (32.3%), schizophrenia (6.1%), bipolar (4.6%), alcoholism (3.1%) and other (1.5%). Physical activity levels were reported as being below the recommended amounts of 30 minutes at a moderate intensity on a minimum of 5 days per week. Participants reported, a mean of 2.8 days of activity (SD = 2.2) in the previous week with no difference between inpatients and outpatient responses.

### 2.2. Effect Size

Of the two studies undertaken within this area effect size varies. Bartholomew [24] reported a medium effect size ( $n = 40$ ), while Weinstein [25] found a small effect size ( $n = 14$ ). Research in the general population relating to single bout exercise and mental health has typically also found a medium effect size [14,15]. Therefore using a medium effect size of  $d = 0.6$  and a power of 0.8 [27] 45 participants were required for this research.

### 2.3. Measures

Participants completed a self report questionnaire comprising of demographic information, a single item measure of physical activity, the Brunel Universal Mood States (BRUMS) questionnaire and the Rosenberg Self-esteem scale.

The physical activity single item measure has been taken from the Outdoor Health Questionnaire used in the

national Walking for Health scheme. The measure has been validated [28] and the single item physical activity question has been used independently as a self-reported method of obtaining levels of physical activity [29].

The BRUMS has been regularly used to assess mood [30]. The original POMS [31] has been adapted to create a shorter 24 item version, BRUMS, that has been tested for validity and reliability [32,33]. The BRUMS has 6 mood dimensions; tension, depression, anger, vigour, fatigue and confusion. Answers are on a five point Likert scale, ranging from “not at all” to “extremely”.

The Rosenberg Self Esteem scale [34] assesses global self-esteem and is one of the most widely used tests by psychologists for this purpose. The scale has ten items on a four point Likert-type scale ranging from “strongly agree” to “strongly disagree”, and has been used within this population group [35].

### 2.4. Procedure

A questionnaire was developed in conjunction with the mental health Hospital ensuring it was appropriate for their patient group. Potential participants were initially approached by a member of staff, and the study explained to them. Participants were then given seven days to consider participation. Written informed consent was obtained, following which questionnaires were issued to patients by staff immediately pre and post exercise. The exercise sessions consisted of 45 minutes of moderate intensity aerobic exercise (intensity was self-reported). Participant anonymity was ensured through the use of ID numbers.

Participants met the inclusion criteria if they were: 1) a patient at the mental health hospital; 2) taking part in an exercise group at the hospital; 3) well enough on the day to complete the questionnaire; 4) over 18 years of age. Participants were informed that the questionnaire would take 10 - 15 minutes to complete pre-exercise and up to 5 minutes post exercise. Participants were able to withdraw from the study at any point. If participants requested support in filling out the questionnaire, this was provided by hospital staff. A private room was available for those completing the questionnaire. Analysis was undertaken on data collected as part of a service evaluation by the hospital. Ethical approval was granted for the analysis by Staffordshire University Faculty of Health Sciences Ethics Board; NHS ethics were informed, but as this was a service evaluation NHS ethics approval were not necessary.

## 3. Results

Due to incorrectly completed questionnaires 11 participants were removed from the study. As such analysis was undertaken on 54 participants.

**Figure 1** highlights pre and post changes in mood and self-esteem. It can be observed that negative mood states

all decrease, with the exception of fatigue. Vigour and self-esteem, which are positive moods state increase.

The data set was screened for parametric assumptions and was found to lack normal distribution. As such, non-parametric tests were applied. A Wilcoxon signed rank test for matched pairs was undertaken, using SPSS 17.

A significant difference was identified between pre and post scores for depression ( $T = 0.5$ ,  $p = 0.000$ ,  $N = 54$ ,  $r = 0.678$ ), anger ( $T = 14.5$ ,  $p = 0.000$ ,  $N = 54$ ,  $r = 0.530$ ) confusion ( $T = 113.0$ ,  $p = 0.008$ ,  $N = 54$ ,  $r = 0.364$ ), anxious tension ( $T = 52.5$ ,  $p = 0.000$ ,  $N = 54$ ,  $r = 0.575$ ) and vigour ( $T = 342.0$ ,  $p = 0.012$ ,  $N = 54$ ,  $r = 0.344$ ). There was no significant difference identified between fatigue scores. A significant difference was identified between the pre and post self-esteem scores ( $T = 203.5$ ,  $p = 0.000$ ,  $N = 54$ ,  $r = 0.505$ ).

Further post-hoc analysis was then undertaken to investigate any difference in scores regarding mental health diagnosis. A Kruskal-Wallis one way ANOVA by ranks was carried out for all five diagnoses, for each variable (*i.e.*, depression and post depression) and found no significant difference between scores regarding mental health diagnosis. A significant difference was also not noted if those diagnoses with less than five participants

were removed (*i.e.* analysis only on anxiety  $n = 28$ ; and depression  $n = 17$ ). Suggesting mental health diagnosis does not affect the pre-post relationship.

#### 4. Discussion

This study was designed to assess the effect of a single, hospital based exercise session on mood and self-esteem in individuals with a clinical mental health diagnosis. The results suggest a significant improvement in six mood states; depression, anxious tension, anger, confusion and vigour and self-esteem.

The results replicate those of healthy populations suggesting that a single bout of exercise significantly influence mood states [12-15]. The findings also support the two previous studies in participants with a clinical diagnosis of depression [24,25].

The only mood state that did not show a significant difference was that of fatigue. However, this could be due to a misinterpretation regarding definition, with participants confusing mental fatigue with physical fatigue, thus this result should be taken with caution [24].

Previous research into the effect of a single bout of exercise on psychological outcomes, for individuals with a mental health diagnosis, has focused on depression

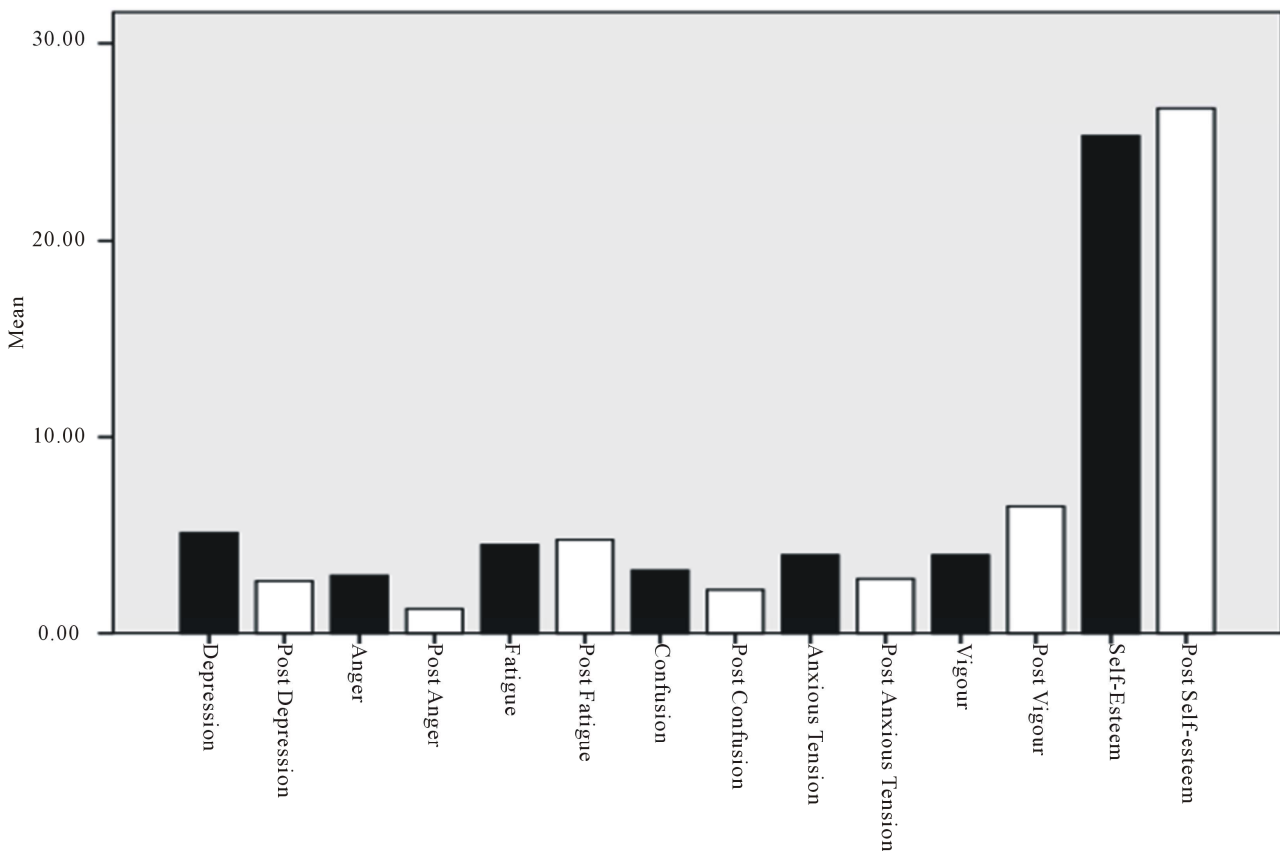


Figure 1. Graphical representation of mean mood and self-esteem results.

[24,25]. The present study aimed to collect data from participants with a range of mental health diagnosis. A significant difference was recorded over time when participants were treated as a single cohort. Further analysis into mental health diagnosis noted no significant difference between diagnoses and psychological characteristics over time. Though due to low sample sizes (when separated by diagnosis) this is not surprising and warrants further investigation.

In comparison to previous research, the sample size used in this pilot study was larger [24,25], but this research used participants with a range of diagnosis. As such, if further research was to be undertaken it would be beneficial to collect a larger sample size to fully investigate the effect of a single bout of exercise on a range of clinical diagnosis.

## 5. Limitations

The measure of intensity was self reported, leading to a potential for miss representation. Sample size was relatively small when participants were separated by diagnosis, which caused issues with intergroup comparisons. Caution needs to be undertaken when generalising these findings as individuals with dual diagnosis were excluded and other co-morbidities were unreported.

## 6. Conclusion

Overall, despite some limitations, this remains the first investigation into the effect of a single bout of exercise on aggregated individuals with a clinical mental health diagnosis. The positive results from this study are encouraging and provide support for further research in the area. If such results can be recreated with larger samples and for a wider range of mental health diagnoses then the possible implications for these findings are vast.

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