Remote home-based resistance exercise acutely improves mood profile in older individuals under social isolation during the COVID-19 pandemic

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Short Report

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Abstract

Purpose

To assess the effect of a remote home-based resistance exercise session on mood profile in older individuals under social isolation during coronavirus 19 disease (COVID-19) pandemic.

Methods

32 older individuals (20 women; age = 67.7 ± 6.4 y) who interrupted their regular physical activity routine during the COVID-19 pandemic participated in a remote home-based exercise session via video call. The Brunel Mood Scale (BRUMS) questionnaire was applied one day before and immediately after a body weight exercise session (three sets of 15 to 30 reps in six exercises) to evaluate participants' mood state.

Results

Significant post-exercise reductions ($P < 0.05$) were found in tension (41.2 ± 8.1), depression (61.7 ± 41.8 %), anger (81.2 ± 66.2 %) and mental confusion (42.9 ± 33.1 %), while a significant post-exercise increase ($P = 0.023$) was found in vigor (18.5 ± 5.1 %). No significant difference between pre- and post-exercise was found in fatigue. The post-exercise changes on mood state factors resulted in significant reduction ($P = 0.032$) on total mood disorder score (20.2 ± 11.1 %) after exercise.

Conclusion

A remote home-based resistance exercise session was effective to improve mood profile in older individuals under social isolation during COVID-19 pandemic.

1. Introduction

The pandemic of coronavirus disease 2019 (COVID-19) is a public health ongoing challenge, responsible for 162 704 139 confirmed cases and 3 374 052 deaths worldwide (as of May 17, 2021) ¹. An efficient way to stop the rapid spread of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and its consequences is through social isolation ². However, recent studies suggest that home confinement can reduce the physical activity levels and increase sedentary behavior in the older ^{3,4}. In addition, the COVID-19 home-confinement promotes negative effects on mental and emotional health, and on sleep quality in individuals with unhealthy lifestyle behaviors ⁵.

In contrast, physical exercise may be an alternative tool as adjunctive treatment for depression and maintaining mood, including in older individuals ⁶. In addition, a single session of aerobic exercise (60–

70% HRmax) can acutely improve mood state, even in people diagnosed with clinical depression⁷. Thus, in a context of pandemic and social isolation, the application of remote physical exercise sessions may be an alternative to overcome sedentary behavior, to improve mood state, and to prevent possible depressive symptoms, while maintaining social isolation for preventing SARS-CoV-2 contamination³⁻⁶.

However, according to our knowledge, there are few studies that investigated the effects of a remote physical exercise session on mood state in older individuals. Thus, the purpose of the present study was to assess the effect of a remote home-based resistance exercise session on mood profile in older individuals under social isolation during COVID-19 pandemic.

2. Methods

2.1 Population and Study Design

This is a cross-sectional single-blinded study with a single intervention that investigated the effect of a remote home-based resistance exercise session on mood profile in older individuals. Thirty-two previously active older individuals (20 women; age = 67.7 ± 6.4 y), who interrupted their physical activity routine during the beginning of COVID-19 pandemic, volunteered to participate in the study. Inclusion criteria included (1) age above 60 years, (2) to have practiced physical exercise for at least the two months prior the beginning of COVID-19 pandemic, (3) not to have any limitation to practice physical activity, and (4) to have stopped their exercise routine and to be under social isolation for at least 3 months. The participants included in the study were contacted twice by telephone video call. The first call had a detailed description of study protocol, and explanation on how to answer questionnaires. Participants then gave their written informed consent (online version approved by the Research Ethics Committee of School of Sciences of UNESP) and answered the Brunel Mood Scale (BRUMS) questionnaire. The second call was performed in the day after the first call, at the same time of day, and consisted of a remote resistance exercise session. Participants then answered the BRUMS questionnaire immediately after exercise cessation. All procedures were approved by the Research Ethics Committee of School of Sciences of UNESP.

2.2 Mood State Profile Assessment

Mood state profile was assessed by BRUMS questionnaire, validated for Brazilian population⁸, 24 hours before (pre) and immediately after (post) the resistance exercise session. In brief, the participants answered the 24 items (in a 0–5 Likert scale) that quantifies five negative (tension, depression, anger, fatigue, and mental confusion) and one positive (vigor) mood factors (mood scores range 0 to 20 for each factor). The total mood disorder was then calculated by the formula: total mood disorder = (tension + depression + anger + fatigue + confusion) - vigor + 100⁹.

2.3 Exercise Intervention

Three sets of 15 to 30 reps, with 45 s interval between sets, were performed in six resistance exercises, at the following order: squat, stiff, calf raise, push-up on the wall, shoulder press, and upright row. Squat, calf raise and push-up exercises were performed using only body weight, while a broomstick or bag were added to stiff, shoulder press and upright row exercise.

2.4 Statistical analysis

The Shapiro-Wilk and Levene tests were used to assess normality and homoscedasticity of data, respectively. The paired Student’s t test was used to identify differences in mood state variables between pre- and post-exercise. Data are expressed as mean ± standard deviation, and the level of significance was set at $P < 0.05$.

3. Results

The remote home-based resistance exercise session was well-tolerated by all participants and no adverse events occurred during sessions. Mood state data measured 24 hours before (pre) and immediately after (post) resistance exercise session are displayed in Table 1. Significant post-exercise reductions were found in tension ($41.2 \pm 8.1 \%$, $t = 5.42$, $P = 0,013$), depression ($61.7 \pm 41.8 \%$, $t = 4.27$, $P = 0,010$), anger ($81.2 \pm 66.2 \%$, $t = 4.76$, $P = 0,002$) and mental confusion ($42.9 \pm 33.1 \%$, $t = 3.31$, $P = 0.047$), whereas a significant post-exercise increase was found in vigor ($18.5 \pm 5.1 \%$; $t = -2.40$, $P = 0.023$). However, no significant difference between pre- and post-exercise was found in fatigue. The significant improvements on mood state factors resulted in reduced total mood disorder ($20.2 \pm 11.11 \%$, $t = 4.32$, $P = 0.032$), and improved iceberg profile (lower levels of negative factors and higher levels of vigor) after exercise (Figure 1).

(insert Table 1 and Figure 1 above here)

Variable	Pre	Post
Tension	6.9 ± 4.3	4.1 ± 4.0 *
Depression	3.6 ± 3.9	1.4 ± 2.2 *
Anger	3.6 ± 3.3	0.7 ± 1.2 ***
Vigor	9.6 ± 3.3	11.4 ± 3.2 *
Fatigue	6.2 ± 4.1	5.1 ± 4.1
Mental confusion	4.3 ± 4.1	2.5 ± 2.7 *
Total mood disorder	115.1 ± 17.1	102.3 ± 13.6 **

Table 1: Mood state 24 hour before (pre) and immediately after (post) a remote home-based resistance exercise session.

Asterisk denotes significant difference from pre (* = $P < 0.05$; ** = $P < 0.01$; *** $P < 0.001$).

4. Discussion

The main finding of the present study was that a remote home-based resistance exercise session, using body weight or simple tools to promote resistance (i.e.: broomstick and/or bag), was effective to improve several mood factors (i.e.: tension, depression, anger, mental confusion, and vigor), resulting in reduction of total mood disorder score. According to our knowledge, this the first study to assess the acute effect of remote home-based resistance exercise on mood profile in older individuals under social isolation during COVID-19 pandemic.

The direct relationship between physical activity and/or exercise with mental health related symptoms such as depression, anxiety and stress has been shown previously ¹⁰⁻¹². In addition, previous studies performed prior to COVID-19 pandemic showed that a single bout of exercise promotes acute positive effects on several humor variables in healthy ^{13,14} and clinical populations ^{7,13}, as well as in older individuals ¹³. The improvements on tension, depression, anger, mental confusion, and vigor found in the present study corroborate the above-mentioned positive effects of exercise on humor profile, and shows for the first time that this positive effect may occur in older individuals, via a remote-oriented home-based resistance exercise session, and during a situation of substantial psychological distress that is the social isolation during the COVID-19 pandemic ¹⁵.

Previous studies have suggested that acute exercise-related improvements on mood state are associated to increased cognitive activation, self-esteem, self-control and self-efficacy, as well as to the pleasure of performing the activity, and routine breaking ^{14,16}. In addition, a single exercise session also increases neurotransmitters expression (during and after exercise) ¹⁷, the release of hormonal cascades ¹⁸. Thus, it is possible that at least some of above-mentioned mechanisms are related to the present mood profile improvement found after the remote home-based resistance exercise session.

The inclusion of only older individuals with previous history of physical activity, but who interrupted their physical activity routine for the previous three months, does not allow us to extrapolate present finds for other older population (i.e.: currently actives individuals or individuals without previous history of physical activity), which is a limitation of the present study. The measure of mood state immediately after the exercise is also a limitation because it is not possible to know if the mood profile improvement is maintained along the day. Finally, the cross-sectional design does allow us to state that present acute improvements would persist after a long period of training. However, the initial step to analyze the effect of any intervention is by assessing its acute response, whereas training studies may be not justified without a safe and efficient acute response.

The present study has also important clinical implications. Total mood disorder scores of 115 appears to be the cutoff score that may further sensitize the individual to events related to psychological issues ^{9,19}. Thus, the present reduction on total mood disorder from nearly ~ 115.1 (pre-exercise) to nearly ~ 102.3 (post-exercise) suggests that home-based resistance exercise may have important implications for preventing psychological disorders in the present population. These finding may be even more relevant in

the context of social isolation during COVID-19 pandemic, where mood disorders may be potentiated due to the distance from family and friends, as well as concerns and pressures related to family financial issues^{10,20}. Finally, the social isolation during COVID-19 appears to result in substantial reduction in physical activity levels of older individuals³, which may increase the global burden of diseases^{4,11,20}. Thus, remote home-based resistance exercise programs may be a safe tool for counteracting the physical inactivity during the present and future pandemics.

In summary, a remote home-based resistance exercise session improved tension, depression, anger, mental confusion, and vigor in older individuals under social isolation during COVID-19 pandemic. These findings suggest that remote home-based resistance exercise may be safe and effective to mitigate the negative impacts of COVID-19 pandemic on mood in older population. However, future longitudinal studies are needed to observe the long-term results.

Declarations

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Author's Contributions

GSZ and MMSC participated in study design, literature review, data collection and analysis, and manuscript writing. VTA participates in data analysis, literature review and manuscript writing. BF participated in manuscript writing. EGC prepared the study, supervised the division of tasks, and participated in data analysis and manuscript writing. All authors approved the final version of the manuscript.

Competing interests

The authors declare that they have no competing interests.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

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Figures

Figure 1

Asterisk denotes significant difference from pre (* = $P < 0.05$; ** = $P < 0.01$; *** $P < 0.001$).