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## Yoga reduced depression during Covid-19 lockdown

To the editors,

During the critical phase of the Pandemic of COVID-19, several preventive measures were adopted, mainly social distancing, and reducing the level of physical activity in most people, which generated greater impacts on the mental and physical health of these people. Although these restrictions support decreasing the infection and proliferation rates, such limitations result in negative effects, such as limiting participation in daily physical activities, increased sleep disorders and (Gualano et al., 2020).

The effects of physical activity on the regulation of anxiety and stress in young people and adults in the middle of a pandemic are well established (James Faulkner et al., 2021), however, there are no guidelines that specify the practice of physical activity recommended for training at home during social isolation. On the other hand, Yoga is an ancient oriental practice that combines physical postures, breath control and meditation, aiming at physical and mental well-being (Govindaraj et al., 2016). According to Lorenc et al. (2018), yoga can be suggested as a monotherapy for depression, panic syndrome and sleep disorders. Thus, the incentive to practice physical activity at home and specially to practice yoga is an extremely important proposal during the confinement period experienced by the pandemic of COVID-19 (Aquino et al., 2020). In this sense, the aim of this study was to evaluate the effects on mental health through the yoga practice performed online during the pandemic period.

We evaluated the levels of physical activity and mental health of participants who were part of remotely applied activities. This study cross-sectional was conducted in 2020 during the lockdown of the COVID-19, remotely active. Brazilian participants, granted for convenience of two groups with the participation of 22 volunteers of both sexes, aged between 20 and 45 years ( $33 \pm 9$ ) divided into: the experimental group of 11 participants with yoga training and the physically active group containing 11 participants. The participants were submitted to IPAQ and DASS21 questionnaires. In the yoga group, none of the participants presented indexes for depression, however, in the active group, the levels of depression were much higher, 9% of the participants with levels of light depression, 18% with moderate indexes, 18% with the index for severe depression and 18% extremely severe depression. The anxiety levels for the yoga group were 9% mild anxiety, when compared to the active group there was a significant difference, where 18% of the participants had moderate levels of anxiety, with 9% severe and 27% of the volunteers had extremely high levels of anxiety serious during the isolation phase. Besides, the yoga group had mild stress levels in 36% of the participants. The active group had 36% of participants with mild levels of stress, 18% with moderate rates, and 27% with severe stress rates, as can be seen, most yoga participants achieved levels of anxiety, depression, and stress within normal levels, unlike the active group, evidencing the size of the effect of yoga practice on mental health. After the end of the 8-week the group that performed yoga had a lower depression score compared to the physically active (95%CI  $-24.00$  to  $-6.000$ ;  $p = 0.0005$ ). The yoga intervention considerably reduced anxiety values (95%CI  $-16.00$  to  $0.000$ ;  $p = 0.028$ ) and stress (95%CI  $-18.00$  to  $-2.000$ ;  $p = 0.0114$ ) compared to subjects who only performed physical activity during the same period. total-DASS 21 scores were lower in individuals who performed yoga compared to the group who only remained physically active (95%CI  $-27.00$  to  $-5.000$ ;  $p = 0.0033$ ).

Through the IPAQ questionnaire for both groups. These results are contained in MET (Task Metabolic Equivalent), which includes for each type of activity the minutes per week according to their frequency, intensity, and duration, also attributing the metabolic expenditure. Between the physically active and yoga groups, the levels of moderate physical activity showed no significant difference. On the other hand, the level of vigorous physical activity was higher in the physically active group when compared to the yoga group (95%CI  $-3075$  to  $-165.0$ ;  $p = 0.0322$ ). Thus, the level of total physical activity was higher in the trained group compared to the yoga group (95%CI  $-6822$  to  $-510.0$ ;  $p = 0.0281$ ). In the physically active group, there was a negative correlation between the level of total physical activity and the total score of the DASS-21 (95%CI  $-710.4$  to  $304.7$ ;  $F = 5.892$ ;  $p = 0.04570$ ,  $R = -0.6761$ ). For the group of individuals who performed yoga, there was no significant difference, more homogeneous data.

The results of increased levels of depression, anxiety, and stress were caused by the daily fear experienced at that moment in isolation (Malta, 2012). In this sense, our results suggest that these effects can be minimized through healthy lifestyle habits. We can verify the practice of physical activity (total MET above 5176.90) associated with the practice of yoga, improved the quality of life and mental health of the participants. Physical activity causes a wide range of biological changes in the brain (Voss et al., 2013). The remarkable amplitude and diversity of these changes suggest that exercise can produce its effects through multiple pathways, including the anti-inflammatory effect to play a role in the pathophysiology and treatment of depression and anxiety (Eyre and Baune, 2014). Studies have shown that yoga can increase the endogenous release of the neurotransmitter, dopamine, within the ventral striatum (Kjaer et al., 2002), as well as the thalamic levels of the neurotransmitter gamma-aminobutyric acid (GABA). Both dopamine and GABA play an important role in the pathophysiology of psychological distress. However, there is a notable lack of direct research on the anti-inflammatory properties of exercise and yoga in people with depression.

This experimental study makes a contribution to the literature, as it suggests that long-term yoga practice performed remotely improves the quality of life by reducing mental health disorders such as depression, anxiety, and stress in confined participants during the COVID-19 pandemic associated with a moderate level of physical activity. Therefore, yoga becomes one of the best strategies to improve psychological problems caused by crises.

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## Declaration of Competing Interest

None.

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## Informe consent

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## Supplementary materials

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