

Symptoms of anxiety and depression modulated by physical exercise and food consumption during the COVID-19 pandemic

Sintomas de ansiedade e depressão durante a pandemia da COVID-19: um estudo comparativo em função da prática de exercício e qualidade da alimentação

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ABSTRACT

Objective: Falls This study aimed to compare the symptoms of anxiety and depression in Brazilian adults during the COVID-19 pandemic as a function of exercise practice and food quality. **Methods:** Cross-sectional and observational research, carried out with 1,118 adults (18 to 59 years old) from different regions of Brazil. A questionnaire with sociodemographic, physical exercise, nutrition and social isolation issues during the COVID-19 pandemic was used. The Hospital Anxiety and Depression Scale (HAD) was also used. **Results:** Data analysis was performed using the Koolmogorov-Smirnov test, Levene's homogeneity of variance test and independent t test ($p < 0.05$). Individuals who reported that they did not practice physical exercise before social isolation had higher scores for both anxiety and depression ($p = 0.001$). On the other hand, individuals who reported that they were exercising during social isolation had lower scores for both anxiety and depression ($p = 0.001$). Individuals who reported eating a greater quantity and poorer quality of food during isolation had higher scores in both variables. **Conclusion:** It is concluded that the practice of physical exercise and the quality of food proved to be possibly intervening factors in the symptoms of anxiety and depression before and during the period of social isolation caused by the COVID-19 pandemic.

Keywords: COVID-19, Anxiety, Depression, Feeding Behavior, Exercise

RESUMO

Objetivo: Comparar os sintomas de ansiedade e depressão de adultos brasileiros durante a pandemia da COVID-19 em função da prática de exercício e qualidade da alimentação. **Método:** Pesquisa transversal e observacional, realizada com 1.118 adultos (18 a 59 anos) de diferentes regiões do Brasil. Foram utilizados um questionário com questões sociodemográficas, de prática de exercício físico, alimentação e isolamento social durante a pandemia da COVID-19. Foi utilizada também a Escala Hospitalar de Ansiedade e Depressão (HAD). **Resultados:** A análise de dados foi realizada por meio do teste Koolmogorov-Smirnov, teste de homogeneidade das variâncias de Levene e teste t independente ($p < 0,05$). Os indivíduos que reportaram que não praticavam exercício físico antes do isolamento social apresentaram maiores escores tanto de ansiedade quanto de depressão ($p = 0,001$). Já os indivíduos que reportaram estar praticando exercício durante o isolamento social apresentam menores escores tanto de ansiedade quanto de depressão ($p = 0,001$). Os indivíduos que reportaram estar ingerindo maior quantidade e pior qualidade de alimentos durante o isolamento, apresentam maiores escores em ambas as variáveis. **Conclusão:** A prática de exercício físico e a qualidade da alimentação demonstraram ser, possivelmente, fatores intervenientes nos sintomas de ansiedade e depressão antes e durante o período de isolamento social provocado pela pandemia da COVID-19.

Palavras-chaves: COVID-19, Ansiedade, Depressão, Comportamento Alimentar, Exercício Físico

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INTRODUCTION

The COVID-19 pandemic had a powerful impact on public health and, therefore, the monitoring and surveillance of mental health related variables became an immediate priority.¹ Social distancing, advocated during the pandemic, was an unpleasant experience for many people. The separation from loved ones, the loss of freedom, uncertainty, and boredom can lead to anxiety, psychological stress, depression, and even suicide. Recent evidence suggests that people kept in isolation and quarantine experienced higher levels of anxiety, anger, confusion, and psychological stress.² Additionally, the prevalence of anxiety, depression, and psychological stress during the COVID-19 pandemic appears to be higher among women.³⁻⁵

A systematic review study with meta-analysis showed that the prevalence of psychological stress, anxiety, and depression in the general population, as a result of the pandemic, is 29.6%, 31.9%, and 33.7%, respectively, suggesting that psychological interventions to improve the mental health of vulnerable groups during and after the COVID-19 pandemic should be developed.¹ The prevalence of symptoms of depression (26.9%) and anxiety (21.8%) in the Chinese population has been considered moderately high. However, these results may be premature since the number of studies conducted in other countries is still limited, and as China was the initial focus of the COVID-19 outbreak, it may take some time for its impact to be reported worldwide.⁶

It is important to emphasize that symptoms of anxiety and depression weaken the immune system, increasing the risk of getting infected.⁷ In addition, it was identified that Brazilian adults with a previous diagnosis of depression had a higher risk for unhealthy eating behavior⁸ during the pandemic.³ Consequently, it is essential to identify which groups are more associated with mental disorders so that adequate psychological strategies, techniques, and interventions preserve and improve the general population mental health.¹

The adverse psychosocial effects of COVID-19 are underestimated and there is little data available on real the impact of this disease on mental health.²

In addition to the psychosocial issues, recent studies reported that home confinement during COVID-19 reduced physical activity, regardless of the exercise intensity, and increased daily sitting time.^{9,10} Although there is limited support for the notion that physical activity should reduce the severity of the disease,¹¹ it is known that physical exercise is better sedentarism for physical and mental health.¹² As gyms, public parks, sports courts, outdoor recreation areas, and schools were closed,¹³ simple recommendations such as taking breaks throughout the day, increasing home physical activities, and participating in web-based physical activities were suggested to minimize health decline during COVID-19.¹⁴

Combined with physical activity, researchers have identified changes in dietary patterns during the pandemic, such as disturbed eating behaviors, increased consumption of calorie-rich foods,¹⁵ after-dinner snacks, lack of dietary restriction, and eating as a response to psychological stress.¹⁶

As some predictions indicated that the COVID-19¹⁷ pandemic could last longer than 18 months, the negative impact on people's lifestyles, including the low level of physical

activity and inadequate diet, could persist, triggering harmful health outcomes. It is known that good habits can aid psychological well-being, therefore it is meaningful to investigate which variables can be a coping strategy during the pandemic. Also, studies should clarify whether physical activity and eating behavior are effective strategies to deal with this disease and the adverse psychological effects of the COVID-19 pandemic.¹⁸

OBJECTIVE

We designed this study to compare the symptoms of anxiety and depression as a function of physical exercise and the quality or quantity of food consumption of Brazilian adults during the COVID-19 pandemic.

METHODS

This cross-sectional study was designed according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE).¹⁹ The research was part of an institutional project approved by the Research Ethics Committee (3.967.673) of Universidade Cesumar (Unicesumar), Brazil. This study complies with Brazilian research regulations with human models, Resolution 466/12 of the National Health Council.

A sample of 1.118 adults (18 to 59 years old) from different regions of Brazil were included in this study. The participants were recruited according to a non-probabilistic and convenience process, and all participants signed an informed consent form prior to inclusion.

The participants were random people, as the access link to the online questionnaire was made available on different social media, or colleagues and acquaintances of the researchers. There was no identification on whether they were familiar to the researchers or random people.

The electronic questionnaire was structured in two parts. The first included the sociodemographic aspects such as age group, sex, country region (Northern, Southern, Southeastern, Northeastern, or Central), socioeconomic status, physical exercise before and during social isolation, unhealthy eating habits, or worsening of eating habits during social isolations or lockdowns.

We also addressed and stratified their behavior as total, partial, and no social isolation during the lockdowns. Partial isolation was defined as going out only for essential activities, such as medical appointments, shopping for groceries, or going to a drugstore.

The second part of the online questionnaire included the Hospital Anxiety and Depression Scale (HAD). This scale is an assessment that rates the risk of anxiety and depression in two different subscales. The total score on each subscale ranges from 0 to 21, and the classification ranges from low risk of anxiety or depression (0 to 7 points), moderate risk of anxiety or depression (8 to 11 points), and high risk of anxiety and depression (12 to 21 points).²⁰

All quantitative data were collected via an online questionnaire uploaded at the Survey Monkey Web Platform and was distributed to social media outlets such as Facebook, Instagram, and WhatsApp. The online questionnaire remained available from April 20th to May 20th, 2020.

The subjects interested in participating in the research were requested to read and agree with an online informed consent form prior to accessing the online questionnaire. All participants received a brief report containing information about the research purpose before completing the informed consent process. The estimated time for completing the questionnaire was approximately 15 minutes.

Data analysis included descriptive and inferential statistics. Preliminary data analysis was conducted with the Kolmogorov-Smirnov normality test and Levene's test of homogeneity of variances. As the was considered parametric and means and standard deviations were used to characterize the results. The independent t-test was used to compare symptoms of anxiety and depression according to the subgroups. The Cohen's d effect size for differences between two independent sample groups was calculated after each independent t-test.²¹

According to Cohen's criteria, $d = .20$, $d = .50$, and $d = .80$ represent small, medium, and large effect sizes, respectively. All analyzes were performed with the SPSS 22.0 software, and the significance level was set as $p < .05$.

RESULTS

A Table 1 presents the characteristics of the 1118 participants included in the study. There was a higher prevalence of women (70.6%), participants aged between 18 and 39 years (69.1%), with a monthly income of one to five minimum wages (52.1%), living in the Southern region of Brazil (55.5%). Most respondents reported being partially isolated (65.6%). Regarding their behaviors, 61.3% did not practice physical exercise before the isolation, however, 59.5% reported exercising during social isolation. In addition, it is noteworthy that 59.5% of the participants considered they were increased food consumption and decreased food quality during isolation (59.6%).

When comparing symptoms of anxiety and depression as a function of physical exercise before social isolation (Table 2), a statistically significant difference was found between the groups ($p = 0.001$). We emphasize that individuals who reported not practicing physical exercise before social isolation had higher scores for both anxiety and depression.

According to Table 3, a statistically significant difference was found in anxiety ($p = 0.001$) and depression ($p = 0.001$) symptoms as a function of physical exercise during social isolation. This finding indicates that individuals who practiced physical exercise during social isolation have lower scores for both anxiety and depression.

Table 4 compares anxiety and depression symptoms as a function of food consumption during social isolation. A statistically significant difference ($p < 0.05$) was found in the symptoms of anxiety and depression regardless of the group, evidencing that individuals who increased food consumption during isolation had higher scores in both variables when compared to those who did not change their eating habits.

When comparing the levels of anxiety and depression as a function of food quality perception during social isolation (Table 5), there was a statistically significant difference between both groups regarding anxiety ($p = 0.001$) and depression ($p = 0.001$). This finding evidence that individuals who reduced food quality during social isolation had more significant symptoms of anxiety and depression.

Table 1. Characterization of participants

Characteristics	Distribution (%)
Sex	
Male	329 (29.4)
Female	789 (70.6)
Region	
Southern	621 (55.5)
Southeastern	264 (23.6)
Central	23 (2.1)
Northern	31 (2.8)
Northeastern	178 (15.9)
Age Group	
18-28 years	403 (36.0)
29-39 years	370 (33.1)
40-49 years	179 (16.0)
50-59 years	101 (9.0)
Above 60 years	65 (5.8)
Social isolation	
Total	236 (21.1)
Partial	733 (65.6)
None	148 (13.2)
Income	
No answer given	137 (12.3)
Lower than one MW	110 (9.8)
1-5 MW	582 (52.1)
5-10 MW	195 (17.4)
>10 MW	93 (8.3)
Physically active before social isolation	
Yes	433 (38.7)
No	685 (61.3)
Physically active during social isolation	
Yes	665 (59.5)
No	453 (40.5)
Increased food consumption during social isolation	
Yes	665 (59.5)
No	453 (40.5)
Consumption of lower quality food during social isolation	
Yes	451 (40.3)
No	666 (59.6)

MW: minimum wage

Table 2. Comparison of anxiety and depression of Brazilian adults during the COVID-19 pandemic as a function of physical exercise before social isolation

Variables	Physically active before social isolation		p	d
	Yes	No		
Anxiety	8.16 (3.33)	9.18 (3.49)	0.001*	0.29
Depression	5.79 (3.22)	6.86 (3.60)	0.001*	0.31

*Statistically significant difference - $p < 0.05$. Independent t-test; d, Cohen's d effect size

Table 3. Comparison of anxiety and depression of Brazilian adults as a function of physical exercise practice during the COVID-19 pandemic social isolation

Variables	Physically active during social isolation		p	d
	Yes	No		
Anxiety	7.87 (3.11)	9.05 (3.53)	0.001*	0.38
Depression	5.44 (2.93)	6.68 (3.60)	0.001*	0.37

*Statistically significant difference - $p < 0.05$. Independent t-test; d, Cohen's d effect size

Table 4. Comparison of anxiety and depression of Brazilian adults as a function of food consumption during the COVID-19 pandemic social isolation

Variables	Food consumption during social		p	d
	Increased	Unchanged		
Anxiety	9.13 (3.40)	7.73 (3.30)	0.001*	0.41
Depression	6.66 (3.32)	5.52 (3.43)	0.001*	0.29

*Statistically significant difference - $p < 0.05$. Independent t-test; d, Cohen's d effect size

Table 5. Comparison of anxiety and depression of Brazilian adults as a function of the quality of food consumption during the COVID-19 pandemic social isolation

Variables	Food quality during social isolation		p	d
	Worsened	Improved		
Anxiety	9.54 (3.67)	7.88 (3.07)	0.001*	0.49
Depression	7.27 (3.43)	5.47 (3.19)	0.001*	0.54

*Statistically significant difference - $p < 0,05$. Independent t-test; d, Cohen's d effect size

DISCUSSION

The main findings of this study showed a greater tendency towards anxiety and depression among individuals who reported not practicing physical exercise before the COVID-19 pandemic, whereas physically active individuals during social isolation had lower scores for both anxiety and depression. Additionally, more significant anxiety and depression scores were observed in individuals who increased food consumption and reduced food quality during the pandemic.

It is known that physical exercise can reduce and even prevent anxiety and depression by stimulating different mechanisms such as biological, physiological, and psychological. This stimulus provides a strong induction on the level of neurotransmitters associated with anxiety and depression, reducing the psychological stress hormones and decreasing muscle tension.²²

This circumstance may explain the fact that people who did not practice physical exercises before the beginning of the pandemic and social isolation had higher scores of anxiety and depression, even more so because the pandemic itself was a precursor of depressive and anxious symptoms influenced by the low quality of life and the psychological distress.²³ Additionally, such an association seems valid, as it agrees with authors who correlated sedentary habits or diminished physical activity with well-being.^{24,25}

Our results confirm previous studies showing that individuals who practiced physical exercise regularly during the pandemic and social isolation had lower rates of anxiety and depression, suggesting these symptoms are, in general, less evident among these individuals.²⁴⁻²⁷

Concerning eating habits, those who reported increased food consumption or decreased food quality during the COVID-19 pandemic social isolation had more significant anxiety and depression scores when compared to those who did not change their eating habits. This data corroborates with studies on individuals who undergo mental distress. These patients develop an attachment to food or binge eating, leading to excessive food consumption, especially unhealthy foods, which may lead to eating disorders.²⁸

Therefore, it is known that the COVID-19 pandemic increased the potential for adverse psychological and health consequences to the general population. The drastic reduction of physical exercises and the increase in binge eating, both of which show the extreme relevance of psychological support for individuals with eating disorders during the pandemic, are among the reasons for such consequences.²⁹

Despite the importance of our results, this study has some limitations, such as the subjective self-perception of food quality or quantity, the non-probabilistic sample, and the imbalanced sample with more women than men, which may

not reflect the gender distribution of the population.

CONCLUSION

The practice of physical exercise and food quality were possibly intervening factors for symptoms of anxiety and depression before and during the period of social isolation caused by the COVID-19 pandemic.

From a practical perspective, the importance of physical exercise programs is highlighted to control symptoms of anxiety and depression, even if practiced at home, as physical exercise is an essential tool for maintaining mental and physical health.

REFERENCES

- Salari N, Hosseini-Far A, Jalali R, Vaisi-Raygani A, Rasoulpoor S, Mohammadi M, et al. Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. *Globalization and health*. 2020;16(1):1-11. Doi: <https://doi.org/10.1186/s12992-020-00589-w>
- Brooks SK, Webster R K, Smith LE, Woodland L, Wessely S, Greenberg N, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet*. 2020;395(10227):912-920. Doi: [https://doi.org/10.1016/S0140-6736\(20\)30460-8](https://doi.org/10.1016/S0140-6736(20)30460-8)
- Moghanibashi-Mansourieh A. Assessing the anxiety level of Iranian general population during COVID-19 outbreak. *Asian J Psychiatr*. 2020;51:102076. Doi: <https://doi.org/10.1016/j.ajp.2020.102076>
- Liu D, Ren YP, Yan F, Li YQ, Xu XJ, Yu X, et al. Psychological Impact and Predisposing Factors of the Coronavirus Disease 2019 (COVID-19) Pandemic on General Public in China. *SSRN*; 2020: 3551415. Doi: <http://dx.doi.org/10.2139/ssrn.3551415>
- Wang Y, Di Y, Ye J, Wei W. Study on the public psychological states and its related factors during the outbreak of coronavirus disease 2019 (COVID-19) in some regions of China. *Psychol Health Med*. 2021;26(1):13-22. Doi: <http://dx.doi.org/10.1080/13548506.2020.1746817>
- Bareeqa SB, Ahmed SI, Samar SS, Yasin W, Zehra S, Monese GM, Gouthro RV. Prevalence of depression, anxiety and stress in china during COVID-19 pandemic: A systematic review with meta-analysis. *Int J Psychiatry Med*. 2021;56(4):210-27. Doi: <http://dx.doi.org/10.1177/0091217420978005>
- World Health Organization. Mental health and psychosocial considerations during the COVID-19 outbreak [text on the Internet]. Geneva: WHO; c2020 [cited 2021 Ago 6]. Available from: <https://www.who.int/docs/default-source/coronaviruse/mental-health-considerations.pdf>
- Werneck AO, Silva DRD, Malta DC, Souza-Júnior PRB, Azevedo LO, Barros MBA, et al. Lifestyle behaviors changes during the COVID-19 pandemic quarantine among 6,881 Brazilian adults with depression and 35,143 without depression. *Cien Saude Colet*. 2020;25(suppl 2):4151-6. Doi: <http://dx.doi.org/10.1590/1413-812320202510.2.27862020>

9. Ammar A, Brach M, Trabelsi K, Chtourou H, Boukhris O, Masmoudi L, et al. Effects of COVID-19 Home Confinement on Eating Behaviour and Physical Activity: Results of the ECLB-COVID19 International Online Survey. *Nutrients*. 2020;12(6):1583. Doi: <http://dx.doi.org/10.3390/nu12061583>
10. Bentlage E, Ammar A, How D, Ahmed M, Trabelsi K, Chtourou H, et al. Practical Recommendations for Maintaining Active Lifestyle during the COVID-19 Pandemic: A Systematic Literature Review. *Int J Environ Res Public Health*. 2020;17(17):6265. Doi: <http://dx.doi.org/10.3390/ijerph17176265>
11. Kaux JF, Francaux M. Physical activity during the Covid-19 pandemic. *Sci Sports*. 2020;35(3):117-8. Doi: <http://dx.doi.org/10.1016/j.scispo.2020.05.001>
12. Jiménez-Pavón D, Carbonell-Baeza A, Lavie CJ. Physical exercise as therapy to fight against the mental and physical consequences of COVID-19 quarantine: Special focus in older people. *Prog Cardiovasc Dis*. 2020;63(3):386-8. Doi: <http://dx.doi.org/10.1016/j.pcad.2020.03.009>
13. Yarimkaya E, Esentürk OK. Promoting physical activity for children with autism spectrum disorders during Coronavirus outbreak: benefits, strategies, and examples. *Int J Develop Disabil*. 2020: 1756115. Doi: <https://doi.org/10.1080/20473869.2020.1756115>
14. Ricci F, Izzicupo P, Moscucci F, Sciomer S, Maffei S, Di Baldassarre A, Mattioli AV, Gallina S. Recommendations for Physical Inactivity and Sedentary Behavior During the Coronavirus Disease (COVID-19) Pandemic. *Front Public Health*. 2020;8:199. Doi: <http://dx.doi.org/10.3389/fpubh.2020.00199>
15. Scarmozzino F, Visioli F. Covid-19 and the subsequent lockdown modified dietary habits of almost half the population in an Italian sample. *Foods*. 2020;9(5):675. Doi: <http://dx.doi.org/10.3390/foods9050675>
16. Zachary Z, Brianna F, Brianna L, Garrett P, Jade W, Alyssa D, et al. Self-quarantine and weight gain related risk factors during the COVID-19 pandemic. *Obes Res Clin Pract*. 2020;14(3):210-6. Doi: <http://dx.doi.org/10.1016/j.orcp.2020.05.004>
17. Center for Infectious Disease Research and Policy. Modeling study suggests 18 months of COVID-19 social distancing, much disruption [text on the Internet]. Minneapolis: CIDRAP; c2020 [cited 2020 Dec 20]. Available from: <https://www.cidrap.umn.edu/news-perspective/2020/03/modeling-study-suggests-18-months-covid-19-social-distancing-much>
18. Violant-Holz V, Gallego-Jiménez MG, González-González CS, Muñoz-Violant S, Rodríguez MJ, Sansano-Nadal O, et al. Psychological health and physical activity levels during the COVID-19 pandemic: a systematic review. *Int J Environ Res Public Health*. 2020;17(24):9419. Doi: <http://dx.doi.org/10.3390/ijerph17249419>
19. Malta M, Cardoso LO, Bastos FI, Magnanini MMF, Silva CMFP. Iniciativa STROBE: subsídios para a comunicação de estudos observacionais. *Rev Saúde Pública*. 2010;44(3):559-65. Doi: <https://doi.org/10.1590/s0034-89102010000300021>
20. Botega NJ, Bio MR, Zomignani MA, Garcia Jr C, Pereira WAB. Transtornos do humor em enfermaria de clínica médica e validação de escala de medida (HAD) de ansiedade e depressão. *Rev Saude Publica*. 1995;29(5):359-63. Doi: <https://doi.org/10.1590/S0034-89101995000500004>
21. Cohen J. *Statistical power analysis for the behavioral sciences*. 2nd ed. New York: Lawrence Erlbaum; 1988.
22. Saeed SA, Cunningham K, Bloch RM. *Depression and Anxiety Disorders: Benefits of Exercise, Yoga, and Meditation*. *Am Fam Physician*. 2019;99(10):620-7.
23. Stanton R, To QG, Khalesi S, Williams SL, Alley SJ, Thwaite TL, et al. Depression, anxiety and stress during COVID-19: associations with changes in physical activity, sleep, tobacco and alcohol use in Australian adults. *Int J Environ Res Public Health*. 2020;17(11):4065. Doi: <http://dx.doi.org/10.3390/ijerph17114065>
24. Schuch FB, Bulzing RA, Meyer J, Vancampfort D, Firth J, Stubbs B, et al. Associations of moderate to vigorous physical activity and sedentary behavior with depressive and anxiety symptoms in self-isolating people during the COVID-19 pandemic: a cross-sectional survey in Brazil. *Psychiatry Res*. 2020;292:113339. Doi: <http://dx.doi.org/10.1016/j.psychres.2020.113339>
25. Qin F, Song Y, Nassis G, Zhao L, Cui S, Lai L, et al. Prevalence of insufficient physical activity, sedentary screen time and emotional well-being during the early days of the 2019 novel coronavirus (COVID-19) outbreak in China: a national cross-sectional study. *SSRN Electron*. 2020;15:5170. Doi: <http://dx.doi.org/10.2139/ssrn.3566176>
26. Jacob L, Tully MA, Barnett Y, Lopez-Sanchez GF, Butler L, Schuch F, et al. The relationship between physical activity and mental health in a sample of the UK public: A cross-sectional study during the implementation of COVID-19 social distancing measures. *Ment Health Phys Act*. 2020;19:100345. Doi: <http://dx.doi.org/10.1016/j.mhpa.2020.100345>
27. Kandola A, Vancampfort D, Herring M, Rebar A, Hallgren M, Firth J, et al. Moving to Beat Anxiety: Epidemiology and Therapeutic Issues with Physical Activity for Anxiety. *Curr Psychiatry Rep*. 2018;20(8):63. Doi: <http://dx.doi.org/10.1007/s11920-018-0923-x>
28. Faber A, Dubé L, Knäuper B. Attachment and eating: A meta-analytic review of the relevance of attachment for unhealthy and healthy eating behaviors in the general population. *Appetite*. 2018;123:410-38. Doi: <http://dx.doi.org/10.1016/j.appet.2017.10.043>

29. Phillipou A, Meyer D, Neill E, Tan EJ, Toh WL, Van Rheenen TE, et al. Eating and exercise behaviors in eating disorders and the general population during the COVID-19 pandemic in Australia: Initial results from the COLLATE project. *Int J Eat Disord.* 2020;53(7):1158-65. Doi: <http://dx.doi.org/10.1002/eat.23317>