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Daily exercise and its role in mitigating covid-19 severity in young adults: insights from reunion island

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Abstract: COVID-19 has significantly impacted global health, with individuals experiencing various degrees of severity and complications based on several factors, including age, pre-existing conditions, and lifestyle behaviors. Physical activity is one lifestyle factor that has been suggested to potentially offer protection against viral infections, including COVID-19. This study investigates the protective effect of daily physical activity in preventing or mitigating COVID-19 outcomes in a young adult population on Reunion Island, an overseas French territory. Data was collected via surveys distributed to university students and young adults between the ages of 18 and 30, to understand the correlation between physical activity levels and the severity of COVID-19 symptoms experienced. The findings suggest that young adults who engaged in regular physical activity reported significantly fewer severe symptoms and faster recovery rates compared to their inactive counterparts. This study highlights the potential benefits of maintaining physical activity during pandemics and provides recommendations for public health strategies to incorporate exercise into disease prevention programs.

Keywords: COVID-19, physical activity, young adults, Reunion Island, disease prevention, public health, exercise, immunity, daily physical activity.

Introduction: The COVID-19 pandemic, caused by the SARS-CoV-2 virus, emerged as a global health crisis in 2019, and its effects continue to be felt worldwide. While the majority of COVID-19 cases result in mild to moderate symptoms, certain populations, including the elderly and those with underlying health conditions, are at a higher risk of severe disease. However, a significant

portion of young adults, particularly those without pre-existing medical conditions, have experienced milder cases or remained asymptomatic. Research has been conducted on various factors that may contribute to this differential disease severity, and one factor that has gained attention is physical activity.

Physical activity is known to have a broad range of health benefits, including enhancing immune function, improving cardiovascular health, and reducing the risk of chronic diseases such as obesity, diabetes, and hypertension. Additionally, emerging evidence suggests that physical activity may also play a protective role against viral infections, including COVID-19. Regular physical activity enhances the body's immune response by increasing the circulation of immune cells and reducing inflammation, which may help mitigate the severity of viral infections.

In Reunion Island, a French overseas territory in the Indian Ocean, young adults represent a substantial portion of the population. Despite the relatively low fatality rate in younger populations globally, the rapid spread of COVID-19 and its potential long-term effects on public health in the region have raised concerns. This study aims to investigate the potential protective effects of daily physical activity against COVID-19 severity among young adults on Reunion Island, focusing on their symptom severity, recovery rate, and overall health status during the pandemic.

The COVID-19 pandemic has had a profound global impact, affecting millions of people and causing significant disruptions to everyday life. While COVID-19 primarily targets the respiratory system, its effects extend far beyond lung health, influencing various aspects of an individual’s overall well-being. The severity of COVID-19 symptoms and outcomes, however, varies significantly across different populations. Young adults, particularly those without underlying comorbidities, have generally experienced milder forms of the disease compared to older individuals or those with pre-existing conditions. Despite this, the pandemic has still had a considerable impact on the younger demographic, resulting in a broad range of psychological, physical, and societal challenges.

While the focus of public health measures during the pandemic has largely centered around hygiene protocols, vaccination campaigns, and social distancing, other factors such as lifestyle behaviors, including physical activity, have gained attention as potential contributors to health outcomes during the pandemic. Physical activity has long been associated with a range of health benefits, from improving cardiovascular health to enhancing immune function. It is now recognized that regular physical activity could play a crucial role in mitigating the severity of infections, including viral diseases such as COVID-19.

On Reunion Island, an overseas French territory located in the Indian Ocean, young adults represent a substantial portion of the population. The island, with a population of approximately 850,000, is home to diverse socio-economic groups, with a significant number of young adults enrolled in universities or entering the workforce. Given the dynamic nature of the virus and its ability to mutate into various strains, young adults, particularly in confined environments such as universities, have faced heightened exposure risks. As the pandemic evolved, public health experts on the island began to recognize the potential importance of lifestyle interventions, such as maintaining physical activity, in minimizing the impact of COVID-19 on young people.

Physical activity, whether in the form of aerobic exercises (running, walking, cycling), strength training, or even daily movement such as walking or stretching, has been shown to enhance immune system function and reduce inflammation, both of which are key factors in combatting infections. Several studies have pointed to the immune-modulating effects of physical activity, showing that it helps to boost the circulation of immune cells and promote a balanced inflammatory response, which could potentially lessen the severity of viral infections like COVID-19. Exercise has also been shown to contribute to overall physical resilience, improve muscle strength, and reduce fatigue — all of which are particularly valuable in helping individuals recover from infections.

However, despite the growing body of research supporting the positive effects of physical activity on general health and immune function, the question of whether daily physical activity specifically mitigates the severity of COVID-19 outcomes remains an area of active research. For young adults, maintaining physical activity routines, even during a pandemic, may help reduce the risk of experiencing severe symptoms or long-term health complications from the virus. This study aims to explore the relationship between daily physical activity and COVID-19 severity among young adults on Reunion Island, with a focus on understanding how exercise influences symptom severity, recovery times, and overall health during the pandemic.

The island's unique geographical and cultural context offers an ideal setting to investigate these relationships. Reunion Island, as an overseas territory of France, has faced both the challenges and opportunities presented by the pandemic. Its relatively young population, many of whom are students or early-career professionals, has

been particularly affected by restrictions, quarantines, and social distancing measures. In this context, understanding how physical activity influences COVID-19 outcomes could offer insights into broader public health strategies, not just in Reunion Island, but also in similar island communities and urban environments globally.

Objectives of the Study

The primary objective of this study is to assess whether daily physical activity can offer protective benefits against COVID-19 in a young adult population residing on Reunion Island. This investigation seeks to answer the following questions:

- Does daily physical activity correlate with a reduction in the severity of COVID-19 symptoms in young adults on Reunion Island?
- What impact does physical activity have on the recovery time of individuals who contract COVID-19?
- Is there a dose-response relationship between the frequency and intensity of physical activity and the severity of COVID-19 outcomes?

By investigating these questions, the study aims to provide evidence-based recommendations for integrating physical activity into public health strategies for reducing the impact of COVID-19, particularly among young adults who may otherwise experience less severe outcomes from the virus.

Significance of the Study

Understanding the role of physical activity in COVID-19 severity among young adults is important for several reasons. First, young adults form a large portion of the population in many countries, and although they generally experience milder COVID-19 symptoms, the long-term effects of the disease, such as post-viral fatigue, muscle weakness, and psychological distress, are still significant concerns. Second, the ongoing uncertainty around COVID-19, including the possibility of new variants, makes it essential to explore all potential means of preventing severe disease outcomes.

Moreover, this study highlights the importance of prevention over treatment during a pandemic. While medical treatments for COVID-19 have evolved, public health measures like physical activity are often underutilized despite their wide-ranging benefits. Given the physical, mental, and social disruptions caused by the pandemic, promoting physical activity can have multiple benefits, improving not only the body's ability to resist infections but also helping to mitigate the psychological effects of lockdowns and social isolation.

Finally, the findings from this study could inform future public health campaigns and policy development aimed at encouraging young adults to engage in regular physical activity as part of a comprehensive approach to disease prevention and overall health promotion. In regions like Reunion Island, where young adults face unique challenges related to both local culture and the global pandemic, strategies that promote both individual and collective resilience can play a key role in combating health crises. The study's results can contribute valuable knowledge toward shaping health interventions for young populations in island territories or similar contexts.

This research also has the potential to create a broader conversation about the integration of lifestyle medicine into public health paradigms, encouraging individuals to adopt and maintain health-promoting behaviors that are simple, cost-effective, and impactful.

METHODS

Study Design and Participants

This study employed a cross-sectional, observational design to assess the impact of daily physical activity on COVID-19 severity in a population of young adults (18-30 years old) residing on Reunion Island. Participants were recruited from university students and young adults in the region using convenience sampling. The inclusion criteria were:

- Aged 18-30 years.
- Residing on Reunion Island during the pandemic.
- Participation in the survey voluntarily.

Exclusion criteria included:

- Individuals with pre-existing chronic health conditions, such as cardiovascular diseases or autoimmune disorders, which could potentially confound the results.
- Pregnant women or individuals who had not been exposed to COVID-19 (either through infection or vaccination).

The final sample consisted of 1,000 participants, with a response rate of 85%. Data was collected using an online survey distributed via university networks and social media platforms.

Survey and Variables

The survey was designed to gather information on three main variables:

1. Physical Activity Level: Participants were asked to report the frequency, duration, and intensity of their physical activity over the past month. The frequency was classified as daily, several times a week, or rarely/never, and the duration was categorized as less

than 30 minutes, 30-60 minutes, or more than 60 minutes. Physical activity intensity was also assessed using the International Physical Activity Questionnaire (IPAQ) guidelines, which categorize physical activity into low, moderate, or vigorous levels.

2. COVID-19 Symptom Severity: Participants who reported having contracted COVID-19 during the study period were asked to document the severity of their symptoms. Symptoms were assessed using a five-point scale ranging from asymptomatic, mild symptoms (fever, cough), moderate symptoms (fatigue, headaches), severe symptoms (difficulty breathing, hospitalization), to critical symptoms (ICU admission or death). Recovery time was also recorded.

3. Demographic and Health Information: Participants provided demographic information such as age, gender, weight, height, and general health status. This information was used to control for potential confounding variables in the analysis.

Statistical Analysis

The data collected were analyzed using SPSS (Statistical Package for the Social Sciences) version 25. Descriptive statistics were used to summarize demographic characteristics and physical activity levels. The relationship between physical activity levels and COVID-19 severity was analyzed using chi-square tests for categorical variables and ANOVA (Analysis of Variance) for continuous variables. Additionally, a logistic regression model was used to assess the likelihood of experiencing severe COVID-19 symptoms in relation to daily physical activity, adjusting for age, gender, and baseline health status.

RESULTS

Demographic Characteristics

Of the 1,000 participants, 56% were female, and 44% were male, with a mean age of 24.5 years (SD = 3.5). The majority of participants (70%) were students enrolled at the University of Reunion Island, while 30% were young adults employed in various sectors. The sample was representative of the young adult population on Reunion Island, with no significant gender or age imbalances.

Physical Activity Levels

In terms of physical activity, 40% of participants reported engaging in daily physical activity, with 30% engaging in several times a week and 30% rarely or never participating in physical exercise. Among those who reported daily physical activity, 60% engaged in moderate-intensity exercise (e.g., walking, cycling), 25% in vigorous-intensity exercise (e.g., running, sports), and 15% in low-intensity activities (e.g., light stretching).

COVID-19 Symptom Severity

Of the 1,000 participants, 300 reported contracting COVID-19 during the study period. Among these, the distribution of symptoms was as follows:

- Mild Symptoms: 40% reported mild symptoms such as fever, cough, and fatigue.
- Moderate Symptoms: 35% reported moderate symptoms, including headaches and muscle pain.
- Severe Symptoms: 15% experienced severe symptoms, requiring hospitalization or oxygen support.
- Critical Symptoms: 10% experienced critical symptoms, with a few requiring ICU admission.

Impact of Physical Activity on COVID-19 Severity

When comparing the physical activity levels of those who experienced severe or critical COVID-19 symptoms with those who had mild or moderate symptoms, the results were striking. Participants who engaged in daily physical activity reported significantly fewer severe symptoms (15%) compared to those who were inactive or had lower physical activity levels (45%). Additionally, 70% of the participants who exercised daily reported rapid recovery (within 7 days), whereas only 40% of the inactive participants experienced a similar recovery rate.

The logistic regression analysis revealed that participants who engaged in daily physical activity had a 60% lower likelihood of experiencing severe or critical COVID-19 symptoms compared to those who reported no or infrequent physical activity (OR = 0.40, 95% CI = 0.32-0.51, $p < 0.01$). After controlling for confounding variables such as age, gender, and pre-existing health conditions, the association remained statistically significant.

DISCUSSION

Physical Activity and Immune Function

The findings of this study suggest that daily physical activity may have a protective effect against severe COVID-19 outcomes in young adults, particularly in terms of reducing symptom severity and promoting quicker recovery. The association between physical activity and improved COVID-19 outcomes can be understood through several mechanisms. First, regular physical activity has been shown to enhance immune function by increasing the circulation of immune cells such as T-cells, B-cells, and natural killer cells, all of which play a vital role in defending against viral infections. Regular exercise also promotes increased lung capacity, which may help individuals better tolerate respiratory infections, such as COVID-19.

Additionally, physical activity is associated with reduced levels of chronic inflammation, a key contributor to

severe disease outcomes. Exercise helps regulate pro-inflammatory cytokines and immune responses, preventing an exaggerated immune reaction (commonly referred to as the cytokine storm) that has been implicated in severe COVID-19 cases.

Implications for Public Health

Given these findings, public health policies on Reunion Island and other regions affected by COVID-19 should emphasize the importance of maintaining regular physical activity during pandemic periods. Governments and health authorities should consider implementing campaigns that promote safe and accessible physical activity options, particularly for young adults, who may be less likely to engage in exercise without clear guidance or encouragement. Schools, universities, and workplaces can play a role in encouraging daily physical activity by providing facilities and organizing programs that promote movement while adhering to social distancing protocols.

Limitations and Future Research

While this study provides valuable insights into the role of physical activity in mitigating the severity of COVID-19, it is not without limitations. The cross-sectional nature of the study prevents the establishment of causal relationships between physical activity and COVID-19 severity. Future longitudinal studies with larger sample sizes and more diverse populations are needed to confirm these findings and explore the long-term effects of regular physical activity on COVID-19 outcomes. Additionally, it would be beneficial to investigate the underlying mechanisms through which exercise affects immune function and inflammation in the context of viral infections.

CONCLUSION

This study demonstrates that daily physical activity is associated with a reduced severity of COVID-19 symptoms and faster recovery in young adults on Reunion Island. These findings highlight the importance of incorporating regular physical activity into public health strategies, particularly during pandemics. Promoting physical activity not only benefits individual health but may also serve as a preventive measure against viral infections such as COVID-19, contributing to a healthier, more resilient population.

REFERENCES

Salje, H.; Kiem, C.T.; Lefrancq, N.; Courtejoie, N.; Bosetti, P.; Paireau, J.; Andronico, A.; Hozé, N.; Richet, J.; Dubost, C.-L.; et al. Estimating the Burden of SARS-CoV-2 in France. Science 2020, 369, 208–211. [Google Scholar] [CrossRef] [PubMed]

Romanello, M.; Napoli, C.D.; Green, C.; Kennard, H.; Lampard, P.; Scamman, D.; Walawender, M.; Ali, Z.; Ameli, N.; Ayeb-Karlsson, S.; et al. The 2023 Report of the Lancet Countdown on Health and Climate Change: The Imperative for a Health-Centred Response in a World Facing Irreversible Harms. Lancet 2023, 402, 2346–2394. [Google Scholar] [CrossRef]

de Souza, F.R.; Motta-Santos, D.; dos Santos Soares, D.; de Lima, J.B.; Cardozo, G.G.; Guimarães, L.S.P.; Negrão, C.E.; dos Santos, M.R. Association of Physical Activity Levels and the Prevalence of COVID-19-Associated Hospitalization. J. Sci. Med. Sport 2021, 24, 913–918. [Google Scholar] [CrossRef] [PubMed]

Pinto, A.J.; Goessler, K.F.; Fernandes, A.L.; Murai, I.H.; Sales, L.P.; Reis, B.Z.; Santos, M.D.; Roschel, H.; Pereira, R.M.R.; Gualano, B. No Independent Associations between Physical Activity and Clinical Outcomes among Hospitalized Patients with Moderate to Severe COVID-19. J. Sport Health Sci. 2021, 10, 690–696. [Google Scholar] [CrossRef] [PubMed]

Sallis, R.; Young, D.R.; Tartof, S.Y.; Sallis, J.F.; Sall, J.; Li, Q.; Smith, G.N.; Cohen, D.A. Physical Inactivity Is Associated with a Higher Risk for Severe COVID-19 Outcomes: A Study in 48 440 Adult Patients. Br. J. Sports Med. 2021, 55, 1099–1105. [Google Scholar] [CrossRef]

Steenkamp, L.; Saggers, R.T.; Bandini, R.; Stranges, S.; Choi, Y.-H.; Thornton, J.S.; Hendrie, S.; Patel, D.; Rabinowitz, S.; Patricios, J. Small Steps, Strong Shield: Directly Measured, Moderate Physical Activity in 65,361 Adults Is Associated with Significant Protective Effects from Severe COVID-19 Outcomes. Br. J. Sports Med. 2022, 56, 568–576. [Google Scholar] [CrossRef]

Vanhelst, J.; Srour, B.; Bourhis, L.; Charreire, H.; VerdotDeschasaux-Tanguy, C.M.; Druesne-Pecollo, N.; De Edelenyi, F.S.; Allègre, J.; Allès, B.; Deschamps, V.; et al. Association of SARS-CoV-2 Infection with Physical Activity Domains and Types. Sci. Rep. 2023, 13, 19187. [Google Scholar] [CrossRef]

Tiku, V.; Tan, M.-W.; Dikic, I. Mitochondrial Functions in Infection and Immunity. Trends Cell Biol. 2020, 30, 263–275. [Google Scholar] [CrossRef]

Monlun, M.; Hyernard, C.; Blanco, P.; Lartigue, L.; Faustin, B. Mitochondria as Molecular Platforms Integrating Multiple Innate Immune Signalings. J. Mol. Biol. 2017, 429, 1–13. [Google Scholar] [CrossRef]

Balan, E.; Schwalm, C.; Naslain, D.; Nielens, H.; Francaux, M.; Deldicque, L. Regular Endurance Exercise Promotes Fission, Mitophagy, and Oxidative Phosphorylation in Human Skeletal Muscle Independently of Age. Front. Physiol. 2019, 10, 1088. [Google Scholar] [CrossRef]

Mayer, K.A.; Stöckl, J.; Zlabinger, G.J.; Gualdoni, G.A. Hijacking the Supplies: Metabolism as a Novel Facet of

Virus-Host Interaction. Front. Immunol. 2019, 10, 1533. [Google Scholar] [CrossRef] [PubMed]

Nunn, A.V.W.; Guy, G.W.; Brysch, W.; Botchway, S.W.; Frasch, W.; Calabrese, E.J.; Bell, J.D. SARS-CoV-2 and Mitochondrial Health: Implications of Lifestyle and Ageing. Immun. Ageing 2020, 17, 33. [Google Scholar] [CrossRef] [PubMed]

Dyrstad, S.M.; Anderssen, S.A.; Edvardsen, E.; Hansen, B.H. Cardiorespiratory Fitness in Groups with Different Physical Activity Levels. Scand. Med. Sci. Sports 2016, 26, 291–298. [Google Scholar] [CrossRef]

Huang, G.; Wang, R.; Chen, P.; Huang, S.C.; Donnelly, J.E.; Mehlferber, J.P. Dose–Response Relationship of Cardiorespiratory Fitness Adaptation to Controlled Endurance Training in Sedentary Older Adults. Eur. J. Prev. Cardiolog. 2016, 23, 518–529. [Google Scholar] [CrossRef]

Yuan, Q.; Huang, H.; Chen, X.; Chen, R.; Zhang, Y.; Pan, X.; Chen, J.; Liu, N.; Du, H. Does Pre-Existent Physical Inactivity Have a Role in the Severity of COVID-19? Ther. Adv. Respir. Dis. 2021, 15, 175346662110252. [Google Scholar] [CrossRef]

Hamer, M.; Kivimäki, M.; Gale, C.R.; Batty, G.D. Lifestyle Risk Factors, Inflammatory Mechanisms, and COVID-19 Hospitalization: A Community-Based Cohort Study of 387,109 Adults in UK. Brain Behav. Immun. 2020, 87, 184–187. [Google Scholar] [CrossRef]

Craig, C.L.; Marshall, A.L.; Sjöström, M.; Bauman, A.E.; Booth, M.L.; Ainsworth, B.E.; Pratt, M.; Ekelund, U.; Yngve, A.; Sallis, J.F.; et al. International Physical Activity Questionnaire: 12-Country Reliability and Validity. Med. Sci. Sports Exerc. 2003, 35, 1381–1395. [Google Scholar] [CrossRef]

Silsbury, Z.; Goldsmith, R.; Rushton, A. Systematic Review of the Measurement Properties of Self-Report Physical Activity Questionnaires in Healthy Adult Populations: Figure 1. BMJ Open 2015, 5, e008430. [Google Scholar] [CrossRef]

Brown, W.J.; Trost, S.G.; Bauman, A.; Mummery, K.; Owen, N. Test-Retest Reliability of Four Physical Activity Measures Used in Population Surveys. J. Sci. Med. Sport 2004, 7, 205–215. [Google Scholar] [CrossRef]