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Impact of Social Distancing on Physical Activity in College Students during the COVID-19 Pandemic

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Impact of Social Distancing on Physical Activity in College Students during the COVID-19 Pandemic

by

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ABSTRACT

The COVID-19 pandemic was one that affected everyone in some way. From mandatory lockdowns to vaccinations, the pandemic took a toll on everyone. This study focused on the impact of the COVID-19 pandemic's mandates on undergraduate college students' rate of physical activity prior, during, and after the pandemic. A sample of 41 college students was recruited via student email. Participants were of all races, ages, and male and female, and they answered questions determining how the pandemic affected them in their physical activity routine, if applicable. As hypothesized, many individuals' physical activity routine was interrupted because of the mandates from the COVID-19 pandemic. From this, studies could include surveying college students who allowed the pandemic to interrupt their physical activity routines, in an effort to gain an understanding as to their motives for doing so. This study would lead to a better understanding of how to appeal to individuals' motivations and possibly increase their rate of physical activity.

Keywords: physical activity, students, COVID-19, gym facilities, mandates, motives

DEDICATION

To mama, daddy, and Karsyn, thank you for being my rock. Thank you for loving me relentlessly and for always being there and for pushing and encouraging me when I felt down. To all my extended family, thanks for all the support and encouragement along the way. We did it!

ACKNOWLEDGMENTS

I would like to take a moment to thank my thesis advisor, Dr. Melissa Ziegler, for her expertise throughout this process. Thank you, also to Dr. Rebecca Holland for her stepping in whenever we needed her.

Finally, I would like to thank Caitlyn Boykin, our statistician, for collaborating with us to complete the project. Without you all, I don't know how I would've made it through. Thank you for believing in me and helping me visualize my project.

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LIST OF ABBREVIATIONS

IRB	Institutional Review Board
M	Average Physical Activity
SD	Standard Deviation
USM	The University of Southern Mississippi
WHO	World Health Organization

CHAPTER I: LITERATURE REVIEW

Transitions in life can be difficult, especially for a young adult. The transition from high school to college can be difficult because of the challenges that arise during a new time in life. One major transition would be one related to physical activity as an undergraduate college student coming from high school. Many students come from schools where "most of the urban youth had athletic involvement" (p.1), but sports and extracurricular activities are not as accessible for everyone in college (Fisher et al., 1996).

Participating in and maintaining physical activity and a good diet is part of a healthy lifestyle (Joseph-Shehu & Ncama, 2017), but not everyone applies this to their daily lives. There are several common barriers to physical activity including a lack of energy, a lack of motivation, a lack of self-confidence, a lack of support, a lack of resources, and a lack of time (Arzu et al., 2006).

The COVID-19 pandemic has been a transition in everyone's lives with mandates such as wearing masks, social distancing, and closures of many businesses. During the height of the COVID-19 pandemic, gym facilities were closed, had limited hours, required cleaning equipment after use, and required patrons to wear masks while exercising (Gentil et al., 2020). Because of these requirements, individuals were not able to perform physical activity in their normal facility if they did not abide by these rules. Since it was difficult to continue physical activity in routine facilities, sedentary behavior during confinement began to rise in students and the highly active population (Castañeda-Babarro et al., 2020). While some people found other avenues to meet their physical activity goals by following workout routines at home or participating in activities programmed by health facilities nearby, some were not able to find other avenues

(Castañeda-Babarro et al., 2020). The mandates provided by our local, state, and federal government even led to mental health concerns and college students fearing for their futures (Csépe et al., 2021). These mental health concerns included depression, stress, insomnia, anxiety and more (Jurecka et al., 2021). Many students were not able to cope with the social isolation during confinement (Jurecka et al., 2021).

While also being confined to their homes, college students began to eat foods that were unhealthy and participated in more sedentary behaviors, since they were not allowed to enter facilities that were not considered essential (Hu et al., 2011). These factors suggest that it is important to discover the overall impacts the pandemic had on these individuals during a crucial transition. The purpose of this project was to understand the impacts of the COVID-19 pandemic on physical activity levels of college students.

Student Athletes during Confinement

Most college athletes during this time experienced many emotions, and most likely, a mix of emotions. Athletes were dealing with stress, depression, insomnia, and anxiety during this time of mandatory lockdown (Jurecka et al., 2021). Current research on the topic did not specifically mention that the athletes were overly fearful of the disease itself or death from the disease, but they were afraid of jeopardizing their athletic careers and the effect of the COVID-19 pandemic on their futures (Jurecka et al., 2021). Many athletes even reported sleepiness, despite an increase in sleep time; this was due to extra time in front of an electronic device before bedtime (Jurecka et al., 2021). Their emotions toward the COVID-19 pandemic played a significant role in how they participated in physical activity and other aspects of daily life (Jurecka et al., 2021). For

example, most of the athletes trained with a trainer or facilitator of their respective sports. During the lockdown, it was more difficult to connect and schedule time to be with trainers, whether it was due to social isolation regulations or personal preference (Jurecka et al., 2021). Coaches and trainers were very important during this time because they were helpful in navigating the moods of their athlete clients (Jurecka et al., 2021). If the athlete was upset or distraught due to the pandemic or any other reasons, the trainer typically was able to depress the mood by relating to them and providing a sense of understanding (Jurecka et al., 2021).

On the other hand, Turkish and Chilean athletes seemingly had the same amount of physical activity during the pandemic as they did prior, and this could be due to the leniency of social isolation mandates in these countries (Jureka et al., 2021). This is an important factor to note since each country has its own regulations. Non-athletes had increased sedentary behaviors during this time (Castañeda-Babarro et al., 2020). A lack of motivation to conduct physical activity before the COVID-19 pandemic probably added to the prolonged sedentary behaviors during confinement. Another factor to consider is that many people who performed some physical activity by completing simple daily tasks were no longer engaged in such activities during the pandemic (Castañeda-Babarro et al., 2020).

COVID-19 Confinement and Sedentary Behaviors

Confinement during the pandemic resulted in a decrease in physical activity for many college students. Students were no longer walking or cycling to get to class, which resulted in increased sedentary behaviors (Castañeda-Babarro et al., 2020). Instead, students were logging on to Zoom calls or had online classes, which did not require much

movement (Castañeda-Babarro et al., 2020). Gallè et al (2020) found that "performing activities on electronic devices was the type of sedentary behavior which showed the highest increase" (p.8), which also limited face-to-face interaction. Surprisingly, the most active students before the COVID-19 pandemic were the least active during confinement (Castañeda-Babarro et al., 2020). This was possibly due to a lack of motivation, social support, or any other barriers that may have hindered them from performing their usual physical activity routines. Males were more commonly motivated by their environment–competition with others in gym facilities–whereas women were more motivated by their weight control (Romero-Blanco et al., 2020). This evidence indicates why men were less likely to participate in physical activity during the pandemic.

Confinement and the Mental State

There are many benefits of physical activity, one being improvement of mental health (Jurecka et al., 2021). Since physical activity is beneficial to mental health, it is important for individuals to meet the weekly recommended amount of physical activity to contribute to good mental health. During this time when so many lacked the accessibility to gym facilities to conduct physical activity, they were more likely to have emotional distress (Jiang et al., 2020). During social isolation from their peers, individuals were no longer receiving satisfaction from interaction with others, which led to depression (Jiang et al., 2020). This is the same for coaches and trainers of athletes and interactive professors that were very influential in students' lives. Coaches were not able to interact with their athletes as much, leaving the athletes to conquer much of their own emotional distress alone (Jurecka et al., 2021).

Another factor to consider is the type of student that participated in the studies that are documented in the literature. Health science students were more prone to engaging in physical activity, more than likely because they knew the negative effects of sedentary behaviors on physical health (Srivastav et al., 2021). It is common, however, for college students to have a "lower perceived value for physical education" (Tao et al., 2019, p. 10), so it is important that students majoring in health sciences have this knowledge and educate other students who may not be as knowledgeable about the benefits of physical activity.

Physical Activity Motives During Confinement

It is important to understand the motives of individuals participating in physical activity. One main motive, especially for college students during the COVID-19 pandemic, was social or familial support, which provides extrinsic support (Tao et al., 2019). Unfortunately, most motivation for individuals in college is extrinsic motivation from others rather than motivation within, which likely contributed to the lack of students exploring alternative methods of completing physical activity during the pandemic (Tao et al., 2019).

While it is important to conduct physical activity, it is equally important to meet weekly requirements of physical activity. Individuals should engage in 150 minutes of moderate-to-vigorous physical activity per week (Gallè et al., 2020). Students had more time and availability to meet this weekly requirement during confinement. Whether students reached this number depended upon their motivation to participate in physical activity during this time. Students had to be creative to engage in physical activity due to the mandates and regulations, but it was possible to meet this weekly goal. Hopefully

during the transition from high school to college, and after the height of such an unprecedented time as the COVID-19 pandemic, students learned how to find intrinsic motivations and creative ways to live a healthier lifestyle.

CHAPTER II: METHODS

Participants

This study used a sample of 42 undergraduate students at The University of Southern Mississippi. The majority of participants were African American (47.6%), followed by Caucasian (45.2%). There were eight male participants (19.0%) and 34 female participants (81.0%). The academic classification of participants was largely junior (52.4%) and senior (45.2%). Their ages ranged from 20 to 23 years and older, with most participants in the 20–22-year age range. See Table 1 for full demographics.

Table 1: Participant Demographics

Demographics		**N**
Race	African American	20
	Asian American	0
	Caucasian	19
	Latin American	0
	Native American	1
	Other	1
	Prefer not to say	1

Table 1: (Continued)

Classification	Freshman	0
	Sophomore	1
	Junior	22
	Senior	19
Age Range	20-22	35
	23 and older	7
Gender	Male	8
	Female	34

Data were collected via the Qualtrics questionnaire survey tool, which allows for complete confidentiality of the participants. Anyone 18 years of age or older and enrolled as an undergraduate student at The University of Southern Mississippi was eligible to participate. Consenting participants first completed a demographic questionnaire followed by a series of questions pertaining to their physical activity routines prior, during, and after the COVID-19 pandemic. One participant was excluded for failure to complete the full questionnaire, resulting in 42 participants in the final analyses. This study was approved by The University of Southern Mississippi Institutional Review Board (IRB 21-156).

Measures

Vaccination Status

The Qualtrics questionnaire assessed the individuals' vaccination status at the time the survey was administered, prior to the availability of booster shots. Participants answered, "Have you received both doses of the COVID-19 vaccination?" with either "Yes", "No", or "Prefer not to say." This showed that when facilities were allowing individuals who were fully vaccinated back into the facility, these students were able to return to their facilities. This measure was vital to the questionnaire as it showed who was taking the recommended steps to move back to normalcy.

Physical Activity Prior to COVID-19.

This questionnaire was utilized to assess individuals' level of physical activity prior to the pandemic. Participants indicated how often they participated in physical activity by answering "Did you participate in physical activity prior to March 2020?" on a three-point response scale of "Yes", "Sometimes", and "No." The date of March 2020 was used because this was the date the World Health Organization (WHO) declared the disease a pandemic (Cucinotta & Vanelli, 2020). The use of this measure was significant because the responses allowed us to determine who was truly affected by the COVID-19 pandemic based on their physical activity prior to the shutdown.

Physical Activity During COVID-19.

The Qualtrics questionnaire was utilized to assess the individuals' physical activity during the pandemic. Participants indicated how often they participated in physical activity by answering "Did you participate in physical activity from March 2020-January 2021?" on a three-point response scale of "Yes", "Sometimes", and "No."

January 2021 was used to indicate the time frame when the vaccine became readily available for the general population in our area (ASPA, 2022). Other measures (questions asking if physical activity was done alone, in a group, with a trainer, or at home, in a park, or in a gym) were used to determine how the participants conducted physical activity.

How COVID-19 Affected Physical Activity.

The Qualtrics questionnaire assessed the individuals' opinion on whether the pandemic affected their previous activity routine on a five-point response scale of "Definitely yes", "Probably yes", "Might or might not", "Probably no", and "Definitely no,"

CHAPTER III: RESULTS

For the primary analyses, a series of paired sample t-tests was conducted to compare the participants' engagement in physical activity prior, during, and after the COVID-19 pandemic (see Table 2). It should be noted that a paired samples t-test with 42 participants would only be sensitive to medium-large effects of Cohen's $d = 0.40$ with 80% power ($\alpha = 0.05$; 2-tailed; Faul et al., 2007)**.** This means this study is not sufficiently powered to reliably detect any effects smaller than $d = 0.40$.

First, a significant difference emerged between the students' activity levels before and during the pandemic: $t(1, 41) = -2.50$, $p = 0.017$, $d = 0.61$. Participants reported conducting greater levels of physical activity prior to the COVID-19 pandemic ($M = 1.45$; $SD = 0.63$) compared to during the COVID-19 pandemic ($M = 1.69$; $SD = 0.64$). Descriptively, approximately 62.0% of the participants reported that their physical activity routine was probably or definitely interrupted by the pandemic.

A significant difference was also revealed among activity levels before and after the pandemic (March 2020 and January 2021, respectively), where $t(1, 41) = 1.65$, $p = 0.107$, $d = 0.84$, where participants reported engaging in more physical activity before the COVID-19 pandemic ($M = 1.45$; $SD = 0.63$) compared to the participants' current levels ($M = 1.69$; $SD = 0.64$). No significant difference was found between activity levels during and after the height of the COVID-19 pandemic, $t(1, 41) = 0.60$, $p = 0.554$. Only 23.8% of the participants reported that they probably or definitely maintained their levels of pre-pandemic physical activity.

Table 2. Statistical Information for Physical Activity Patterns

Physical Activity Patterns	Before M (SD)	During M (SD)	Current M (SD)	t (41)	Cohen's d	p
Before-Current	1.45 (0.63)		1.69 (0.81)	1.65	0.84	0.107
During-Current		1.69 (0.64)	1.69 (0.81)	-0.23	0.68	0.822
Before-During	1.45 (0.63)	1.69 (0.64)		-2.50	0.61	0.017

Note: Higher scores indicate decreased engagement in physical activity; conversely, lower scores indicate higher engagement in physical activity.

Another paired samples t-test was conducted to determine if participants reported differential engagement in physical activity at gym facilities prior to and during the COVID-19 pandemic. Significant difference did emerge: $t(1, 41) = -4.58$, $p < 0.001$, $d = 0.71$. As shown in Table 2, participants reported being more likely to engage in physical activity at a gym prior to the pandemic (M = 1.45; SD = 0.63) compared to during the pandemic (M = 2.19; SD 0.78). Over half (57.1%) of the participants reported that their gym facility closed during the pandemic, while only 9.5% reported that their facility stayed open.

Table 3. Statistical Information for Gym Activity Patterns

	t (41)	Cohen's d	p
Before-During	-4.58	0.71	<.001

A final paired samples t-test was conducted to determine potential changes in participants' engagement in physical activity at their home or local park. As shown in Table 3, no statistically significant difference was observed: t(1,41) t = -1.15, p = 0.256. When examining changes in students engaging in physical activity either alone, in a group, or with a trainer, a change can be seen. Participants were most likely to conduct physical activity in a group pre-COVID (22.9%) compared to during the height of the pandemic (12.8%). Conversely, participants were more likely to conduct physical activity alone during the pandemic (81.0%) compared to before the pandemic began (73.0%). However, this data does not seem to be statistically different.

Table 4. Statistical Information for Outdoor Activity Patterns

	t (41)	Cohen's d	p
Before-During	-1.15	0.13	0.256

CHAPTER IV: CONCLUSION

The present study investigated the effects of COVID-19 on college students' rate of physical activity prior to, during, and after the pandemic. Prior to conducting this study, there was not much literature focusing on this topic; most likely because the COVID-19 pandemic is still ongoing. The literature that was available reviewed the primary and secondary harmful effects of social isolation on physical activity globally.

As hypothesized, many individuals' physical activity routine was interrupted because of the mandates from the pandemic. These results are consistent with prior research on individuals in isolation typically not returning to prior habitual activities. These prior studies provide additional support for this study's findings like those by Schrempft et al. (2019), in which it was found that greater social isolation in men and women is related to reduced everyday objective physical activity and greater sedentary time. This study's results are also consistent with the notion that social isolation results in fewer opportunities to cope with mild mental illness for individuals who used this method to cope with their mental illness (Jiang et al., 2020).

As predicted, this study found that there was a decrease in the amount of physical activity undergraduate students conducted during and after the pandemic. Surprisingly, there were a few gym facilities the participants utilized that were not closed during this time and as expected, there were participants who maintained their physical activity routines during the pandemic. One explanation for these results is that some gyms continued to allow members to utilize their facilities.

With this study, it was found that physical activity in other environments emerged as an important factor during this time for individuals who were motivated enough and

whose facilities were no longer open. According to the participants' responses, many found alternatives outside of a gym facility. Some utilized their home equipment, outside parks/trails locations, and even home programs to remain physically active during this time. However, some gave up altogether and discontinued their physical activity.

As predicted, there were some individuals who lost their activity routine and believe the pandemic caused this. It is important to investigate ways of getting these individuals to return to their routines to decrease the risks that result in not obtaining the required amount of physical activity. This can be done by offering group or one-on-one training sessions or even themed workouts to get people excited about returning to the gym.

Implications

This study has several implications for the health of college students all over the world. Notably, this study highlights the importance of physical activity, examining athletes, students in health professions, and general students, and how the COVID-19 pandemic affected their routines. Health professionals may soon see the negative health effects of this pandemic if they have not already.

Furthermore, clinicians may see an increase in creativity and spontaneity in activity and habits around the world. This will not only be creativity in finding alternative ways to engage in physical activity, but also new skills that individuals picked up during this time of isolation, such as starting businesses like online personal training. Many companies thrived during this time, such as the makers of in-home treadmills. Standard treadmills allowed individuals to meet their weekly requirement for physical activity and stay safe during the COVID-19 pandemic.

This study may show some insight in the future explaining why individuals paused their routines, resulting in inactivity. Because of the extensive period of isolation and depending on the individual, there may be individuals who were once very active, but are no longer active due to this lengthy break. Because of this, there may be an increase in individuals who are diagnosed with obesity in the near future. These individuals may have become discouraged during this time or had trouble returning to their physical activity routine. This is one of the many unfortunate outcomes of the COVID-19 pandemic that will negatively affect the future.

Limitations

With any study, limitations should be recognized when interpreting its results. One limitation of this study is the accidental use of participants aged 17 when the minimum age is 18. Although it was accidental, this data is still relevant to the study, yet could not be utilized as it neglects IRB protocol.

Other limitations of this study include a small sample size. Due to the small sample size where all the participants were in one localized area, it is difficult to determine whether the results of this study apply to all undergraduate students globally. Most importantly, the survey utilized was a self-reported survey. There is no guarantee that the participants answered truthfully, whether consciously or unconsciously.

Additionally, the study did not provide a norm referenced tool to assess physical activity after the pandemic. But COVID-19 is still highly contagious and long-term effects are not fully discovered, so it may be beneficial to conduct a longitudinal or mixed study of the effects of the COVID-19 pandemic on physical activity habits. Also, the measures used to determine the routines of those who conducted physical activity alone,

in a group, or with a trainer are difficult to analyze because these measures were grouped in one question in the survey. When the information was transferred to SPSS to collect the results, the best way to obtain the data was to compare them descriptively rather than statistically. There was the thought to compare only those participants who exercised alone vs those who participated in a group setting; however, reducing the sample size in that manner would have been unfavorable.

Future Directions

For future studies regarding this topic, it may be useful for researchers to investigate a longitudinal or maybe a mixed study to track the effects of activity more thoroughly. This will allow researchers to understand how the pandemic affected participants at different points during the course of the pandemic. Additionally, researchers could investigate individuals with mental health issues who utilized physical activity as a coping mechanism. If their usual routine had been interrupted, it would be important to examine how they coped with their illness, aside from taking prescription medication. This is an important factor to consider because research has shown that "exercise improves mental health by reducing anxiety, depression, and negative mood and by improving self-esteem and cognitive function" (Sharma, 2006, p.1).

Next steps would be understanding the motives for allowing the interruption of physical activity for those whose level of activity decreased during the pandemic. Once clinicians know the motives for these individuals' lack of physical activity, this information should then be applied to ease their transition back into physical activity engagement. Additionally, further research should include surveying students from other universities to obtain a larger sample size as well as students from other geographic

regions. This study can help individuals to see how students react during a tough transition and how they react to unforeseen situations, such as the COVID-19 pandemic.

APPENDIX A: PHYSICAL ACTIVITY QUESTIONNAIRE

Q1 With which race do you identify?

(a)Latin American

(b)Native American

(c)African American

(d)Caucasian

(e)Asian American

(f)Pacific Islander

(g)Other

(h)Prefer not to say

Q2 What is your academic classification?

(a)Freshman

(b)Sophomore

(c)Junior

(d)Senior

Q3 Please select the range below that most appropriately represents your age.

(a)17-19

(b)20-22

(c)23 and older

Q4 With which gender do you most closely identify?

(a)Male

(b)Female

(c)Transgender male

(d)Transgender female

(e)Gender queer

(f)Gender nonconforming

(g)Non-binary

(h)Prefer not to answer

(i)Other _____

Q5 What is your weight?

_____

Q6 What is your height?

_____

Q7 Have you ever tested positive for COVID-19?

(a)Yes

(b)No

(c)Not sure

(d)Prefer not to say

Q8 Have you received both doses of the COVID-19 vaccination?

(a)Yes

(b)No

(c)Prefer not to say

Q9 Do you participate in physical activity (a minimum of 150 minutes of moderate physical activity, 75 minutes of vigorous physical activity per week, or a combination of moderate and vigorous activity)?

(a)Yes

(b)Sometimes

(c)No

(d)Prefer not to say

Q10 Did you participate in physical activity prior to March 2020?

(a)Yes

(b)Sometimes

(c)No

Q11 Did you participate in physical activity from March 2020-January 2021?

(a)Yes

(b)Sometimes

(c)No

Q12 Did you participate in physical activity in a gym before March 2020?

(a)Yes

(b)Sometimes

(c)No

Q13 Did you participate in physical activity in a gym from March 2020-January 2021?

(a)Yes

(b)Sometimes

(c)No

Q14 Did you participate in physical activity in a park or at home prior to March 2020?

(a)Yes

(b)Sometimes

(c)No

Q15 Did you participate in physical activity in a park or at home from March 2020-2021?

(a)Yes

(b)Sometimes

(c)No

Q16 If you participated in physical activity in a gym, did that gym close between March 2020-January 2021?

(a)Yes

(b)No

(c)Didn't do physical activity in a gym

Q17 Did you participate in physical activity alone, in a group, or with a trainer before March 2020? Please select all that apply.

(a)Alone

(b)In a group

(c)With a trainer

Q18 Did you participate physical activity alone, in a group, or with a trainer from March 2020-January 2021? Please select all that apply.

(a)Alone

(b)In a group

(c)With a trainer

Q19 Do you still have your pre-COVID (before March 2020) physical activity routine?

(a)Definitely yes

(b)Probably yes

(c)Might or might not

(d)Probably not

(e)Definitely not

Q20 If you participated in physical activity prior to March 2020, do you think the pandemic interrupted your previous activity routine?

(a)Definitely yes

(b)Probably yes

(c)Might or might not

(d)Probably no

(e)Definitely no

APPENDIX B: IRB APPROVAL LETTER

Office *of*
Research Integrity

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NOTICE OF INSTITUTIONAL REVIEW BOARD ACTION

The project below has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services regulations (45 CFR Part 46), and University Policy to ensure:

- The risks to subjects are minimized and reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered involving risks to subjects must be reported immediately. Problems should be reported to ORI via the Incident submission on InfoEd IRB.
- The period of approval is twelve months. An application for renewal must be submitted for projects exceeding twelve months.

PROTOCOL NUMBER:	21-156
PROJECT TITLE:	Impact of COVID-19 on physical activity patterns of college students
SCHOOL/PROGRAM	Rehabilitation Services
RESEARCHERS:	PI: Carrington Brown Investigators: Brown, Carrington~Holland, Rebecca~Ziegler, Melissa~
IRB COMMITTEE ACTION:	Approved
CATEGORY:	Expedited Category
PERIOD OF APPROVAL:	16-Feb-2022 to 15-Feb-2023

Donald Sacco, Ph.D.
Institutional Review Board Chairperson

REFERENCES

Arzu, D., Tuzun, E. H., & Eker, L. (2006). Perceived barriers to physical activity in university students. *Journal of Sports Science & Medicine, 5*(4), 615–620.

Assistant Secretary for Public Affairs (ASPA). (2022, August 4). Covid-19 Vaccines. HHS.gov. Retrieved August 10, 2022, from https://www.hhs.gov/coronavirus/covid-19-vaccines/index.html

Castañeda-Babarro A, Arbillaga-Etxarri A, Gutiérrez-Santamaría B, & Coca A. (2020). Physical activity change during COVID-19 confinement. *International Journal of Environmental Research and Public Health*, *17*(18), 6878. https://doi.org/10.3390/ijerph17186878

Csépe, P., Dinya, E., Balázs, P., Hosseini, S. M., Küzdy, G., & Rosivall, L. (2021). Impact of the first wave of COVID-19 pandemic on the Hungarian University students' social and health behaviour. *Zeitschrift fur Gesundheitswissenschaften = Journal of Public Health*, 1–7. Advance online publication. https://doi.org/10.1007/s10389-021-01660-5

Cucinotta, D., & Vanelli, M. (2020). WHO declares COVID-19 a pandemic. *Acta Bio-medica : Atenei Parmensis, 91*(1), 157–160. https://doi.org/10.23750/abm.v91i1.9397

Faul, F., Erdfelder, E., Lang, A.G., Buchner A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*(2), 175-191. https://doi.org/10.3758/bf03193146

Fisher, Juszczak, L., & Friedman, S. B. (1996). Sports participation in an urban high school: Academic and psychologic correlates. *Journal of Adolescent Health*, *18*(5), 329–334. https://doi.org/10.1016/1054-139X(95)00067-3

Gallè, Sabella, E. A., Ferracuti, S., De Giglio, O., Caggiano, G., Protano, C., Valeriani, F., Parisi, E. A., Valerio, G., Liguori, G., Montagna, M. T., Romano Spica, V., Da Molin, G., Orsi, G. B., & Napoli, C. (2020). Sedentary behaviors and physical activity of Italian undergraduate students during lockdown at the time of COVID-19 pandemic. *International Journal of Environmental Research and Public Health, 17*(17), 6171. https://doi.org/10.3390/ijerph17176171

Gentil, P., de Lira, C., Souza, D., Jimenez, A., Mayo, X., de Fátima Pinho Lins Gryschek, A. L., Pereira, E. G., Alcaraz, P., Bianco, A., Paoli, A., Papeschi, J., & Carnevali Junior, L. C. (2020). Resistance training safety during and after the SARS-Cov-2 outbreak: Practical recommendations. *BioMed Research International, 2020*, 3292916. https://doi.org/10.1155/2020/3292916

Hu, D., Taylor, T., Blow, J., & Cooper, T. V. (2011). Multiple health behaviors: Patterns and correlates of diet and exercise in a Hispanic college sample. *Eating Behaviors, 12*(4), 296–301. https://doi.org/10.1016/j.eatbeh.2011.07.009

Jiang, L., Cao, Y., Ni, S., Chen, X., Shen, M., Lv, H., & Hu, J. (2020). Association of sedentary behavior with anxiety, depression, and suicide ideation in college students. *Frontiers in Psychiatry*, *11*, 566098. https://doi.org/10.3389/fpsyt.2020.566098

Joseph-Shehu, E. M., & Ncama, B. P. (2017). Evidence on health-promoting lifestyle practices and information and communication technologies: scoping review

protocol. *BMJ open, 7*(3), e014358. https://doi.org/10.1136/bmjopen-2016-014358

Jurecka, A., Skucińska, P., & Gądek, A. (2021). Impact of the SARS-CoV-2 Coronavirus pandemic on physical activity, mental health and quality of life in professional athletes-A systematic review. *International Journal of Environmental Research and Public Health, 18*(17), 9423. https://doi.org/10.3390/ijerph18179423

Romero-Blanco, C., Rodríguez-Almagro, J., Onieva-Zafra, M. D., Parra-Fernández, M. L., Prado-Laguna, M., & Hernández-Martínez, A. (2020). Physical activity and sedentary lifestyle in university students: changes during confinement due to the COVID-19 pandemic. *International Journal of Environmental Research and Public Health, 17*(18), 6567. https://doi.org/10.3390/ijerph17186567

Schrempft, S., Jackowska, M., Hamer, M., & Steptoe, A. (2019). Associations between social isolation, loneliness, and objective physical activity in older men and women. *BMC Public Health, 19*(1), 74. https://doi.org/10.1186/s12889-019-6424-y

Sharma, A., Madaan, V., & Petty, F. D. (2006). Exercise for mental health. *Primary Care Companion to the Journal of Clinical Psychiatry, 8*(2), 106. https://doi.org/10.4088/pcc.v08n0208a

Srivastav, A. K., Sharma, N., & Samuel, A. J. (2021). Impact of Coronavirus Disease-19 (COVID-19) lockdown on physical activity and energy expenditure among physiotherapy professionals and students using web-based open E-survey sent through WhatsApp, Facebook and Instagram messengers. *Clinical Epidemiology and Global Health, 9*, 78–84. https://doi.org/10.1016/j.cegh.2020.07.003

Tao, K., Liu, W., Xiong, S., Ken, L., Zeng, N., Peng, Q., Yan, X., Wang, J., Wu, Y., Lei, M., Li, X., & Gao, Z. (2019). Associations between self-determined motivation, accelerometer-determined physical activity, and quality of life in chinese college students. *International Journal of Environmental Research and Public Health, 16*(16), 2941. https://doi.org/10.3390/ijerph16162941