

Impacts of a Continuing Pandemic on the Health of Students in Higher Education: A Focused Look Over time

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ABSTRACT

The rapid emergence of Covid-19 caught many people off guard worldwide. Online images and videos of patients in Chinese hospitals heralded a pandemic that would negatively impact not just peoples' health, but would hinder efforts by organizations worldwide, including the operations of most universities. Colleges and universities moved learning to virtual delivery and cancelled on-campus activities with little warning. Students and faculty alike had to adapt to the new reality of forced distance education, isolation, and an uncertain future. As might be expected, the pandemic affected students' lives in many ways. This article investigates the impact of a stay-at-home order on the health of students in a higher education environment across two semesters during the height of the pandemic.

Keywords: Health, Higher Education, Mental Health, Pandemic, Physical Health.

Published Online: June 22, 2022

ISSN: 2736-4534

DOI : 10.24018/ejedu.2022.3.3.304

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I. INTRODUCTION

Covid-19 impacted people globally in many different areas of life. In Louisiana, and the Gulf South, a region that has celebrated Carnival for generations, the 2020 festivities seemed somewhat subdued.

Covid-19 as the virus would become known, spread out of China in January 2020 impacting much of Asia, making its way to Europe, Africa, and the Americas in an amazingly short period of time. As its worldwide spread continued unabated, the serious nature of its existence and threat to public health, life, and economic systems, was becoming apparent. In response, many government leaders began issuing stay-at-home orders severely limiting all but "essential" organizations and their employees in the course of their employment.

Educational organizations had their operations suspended or severely limited in efforts to stop the spread of the deadly virus. While educational venues were restricted, education was expected to continue, albeit using distance-delivery technologies.

Mardi Gras 2020 in New Orleans became associated with the term, "super-spreader event" (Mackel, 2021). As Mackel (2021) points out, it is believed an ill Texas resident visiting New Orleans may have been the trigger for the super spreader event as 800 people fell ill during Mardi Gras, followed quickly by another 50,000 during Louisiana's first wave of infections. Weeks later, Governor John Bel Edwards of

Louisiana recognizing the seriousness of the situation, became the ninth U.S. governor to issue stay-at-home orders.

The governor's orders impacted employees at all levels, except those who were deemed "essential workers." The order resulted in Louisiana employees and students leaving work or school to face a novel learning environment. The need for the order by the state's governor coming on the heels of Mardi Gras was no surprise, as Louisiana was then exhibiting the fastest growth rate of virus spread in the United States (Ballard & Karlin, 2020).

In addition to sending students home where their education could continue via distance technologies, Louisiana residents were encouraged to minimize unnecessary travel and to stay home as much as possible (Governor's Order, 2020). Social distancing, washing hands, and other preventive measures were encouraged by both state and federal health authorities.

Educational institutions, and society in general, were impacted by this virus as well as the countermeasures put into place to hopefully slow its spread. In some instances, certain types of crimes saw a decrease in reported cases, while at the same time other areas such as cases of domestic violence saw an increase in reported incidents (Levenson, 2021). The domestic violence increase may have arisen from the fact that victims were isolated in proximity to potential abusers for long periods of time. Reports of murder also saw an increase. Chicago recorded a 50% increase in homicides; Los Angeles, 30%, and New York 40% (Corley, 2021). Stress-related to the pandemic potentially impacted the health of many – even beyond those who caught Covid.

Shopping behavior changes were noted (Budden *et al.*, 2021) and the so-called retail apocalypse (Wyld *et al.*, 2021), continued unabated as brick and mortar stores were shunned, and shopping activities quickly moved online. The closing of approximately 100,000 stores by the end of August 2020 is indicative of the challenges that businesses struggled with (Yelp, 2020; Sraders & Lambert, 2020), and continue to face. Even shoppers' payment methods were impacted, as Apple Pay usage increased by 85%, and the use of "buy now – pay later" contracts rose approximately 90% (Evans, 2020).

Luckily, children were less likely to have been infected by the virus and are less likely to transmit it to others. As a result, the number of emergency room visits by children decreased during the pandemic (Sudhakar, 2022). However, as Sudhakar (2022) reports, the portion of emergency room visits relative to self-harm, firearm injuries, and drug poisoning increased, while the number of visits for eating disorders among adolescents doubled. So, the question remains, what about the impact of the pandemic on college students' lives.

II. A CHANGING ENVIRONMENT CREATES QUESTIONS AS TO IMPACTS REVIEW STAGE

Reactions to a changing environment resulted in changes in teaching. There was increased use of distanced-based education that impacted learning (Budden *et al.*, 2022). The negative impacts of stay-at-home orders resulting from the pandemic were noted in all levels of education. It was reported that K-12 students fell behind – five months on average in mathematics and four months in reading (Dorn *et al.*, 2021). If social and educational isolation negatively impacted the learning process, the isolation and reduced activities of students may also be a cause for concern relative to the impact on student health. The situation begs the question - did Covid-19 and its resulting stay-at-home orders impact student health?

In March, as one midsized regional university in the southeastern U.S. moved students off-campus and transitioned to online classes. Restrictions on travel, reduced socialization, reduced dating, concerns for safety and health, and restrictions on shopping, resulted in changes in the behaviors of students (Budden *et al.*, 2022). The perceived impact of changes in the health of college students is the focus of the current study. Two surveys of university students who were impacted by the pandemic provided the data for this study.

III. OBJECTIVES AND METHODOLOGY

The Covid pandemic causes worry worldwide and continues to impact the learning environment. Distance education, while increasingly utilized prior to the pandemic, took on greater importance as colleges and universities transitioned their in-person classes to an online format (Budden *et al.*, 2022). The movement to online educational delivery across the world was seen as both blessing and bane. Indeed, lawsuits against universities seeking recompense for failing to deliver what was expected have been filed against some universities (Davis, 2020).

As this is being written – March 2022 – two years have passed since Louisiana's governor issued his stay-at-home order. Universities in Louisiana, like most worldwide, have reopened their campuses and are trying to return to an environment as "normal" as possible. Despite returning to campus and a recent lifting of the requirement regarding the wearing of masks in school, some students and faculty are still wearing masks, still social distancing, and not enjoying the lives they lived pre-Covid.

The overall concern is, what impacts on students' perceived health – if any – are resulting from the stay-at-home order? A slate of nine primary objectives was developed and used as the basis for a questionnaire aimed at determining stay-at-home order impacts on the health of students attending a university in the southeast U.S. The University's Internal Review Board approved the study methodology and the questionnaire. Students could opt out of answering any or all questions as per university protocol. Non-responses or not applicable responses were eliminated from the analysis. The two surveys, to ascertain the impacts of the pandemic on student health were conducted to coincide with the end of the spring semester of 2020 which was approximately seven weeks after the state's stay-at-home order was implemented and the end of the Fall (next) semester 2020.

The specific objectives assess the impact of the stay-at-home order, over time and include:

1. To determine the impact on the amount of time students spent exercising.
2. To investigate the impact of the order on the amount of time students spent outdoors during the stay-at-home order.
3. To investigate the impact of the order on the weights of students.
4. To determine if students felt their health had improved pursuant to the order.
5. To assess the impact of the order on the closeness of family members.
6. To determine if students had grown closer to their friends after the order.
7. To determine the impact of the order on student optimism.
8. To determine if students felt their mental health had deteriorated after the order.
9. To determine if students felt stronger after the stay-at-home order.

In the second week of May 2020, the first questionnaire was administered to measure perceived impacts of the order on students' health. The timing was approximately seven weeks after the order. The survey was administered online via Survey Monkey to a selection of eight business classes whose faculty had agreed to participate. Similarly, at the end of the fall semester 2020, the questionnaire was again administered to a similar sample of students. It should be noted that both of these convenience surveys were accomplished while students were off-campus.

Students enrolled in more than one of the participating classes were asked to answer only once in order to prevent duplication. A total of 632 usable questionnaires (294 in spring, and 338 in fall) were returned for analysis.

IV. FINDINGS

Objective #1 was to investigate the reported impact of the order on the amount of time students spent exercising. It was expected the move off-campus would increase the amount of time students would spend exercising. The benefits of exercise are well known. The National Institute on Aging reports that exercise can improve physical health, and mental health, reduce the need for certain medicines, improve balance, help maintain a healthy weight, and produce other health benefits (National Institute on Aging, 2020).

As mentioned on the Mayo Clinic website, exercise can improve one's health and health outcomes, improve social life, control one's weight, and improve personal energy levels and mood (Mayo, 2021). Similarly, Ballantyne notes that the more one exercises, the greater the positive impact on health including a reduction of diseases including diabetes and cancer (2009). The questionnaire in the present study asked students to indicate whether their time spent exercising had decreased, stayed the same, or increased since the move to off-campus.

TABLE I: TIME SPENT EXERCISING

Semester	Decreased	Stayed the Same	Increased
Spring 2020	79 (28.6%)	91 (33.0%)	106(38.4%)
Fall 2020	84 (25.2%)	138 (41.4%)	111 (33.3%)

*n(%).

**Significance = 0.099.

As can be seen in Table I, 38.4% of respondents at the end of Spring reported exercising more after the order than before. At the same time, 28.6% of respondents reported they were exercising less and 33% indicated no change in their exercise regimens. Respondents from Fall indicated 33.3% had increased their level of exercise since the order, 25.2% reported a decrease in exercise while 41.4% reported no change in exercise. The larger percentage of students who reported exercising more at the end of Spring than at the end of Fall appears to account for the Chi-Square significant difference finding at the 0.099 level.

Objective #2 was to determine the impact of the order on the amount of time students spent outdoors and to see if there was a difference between the two surveys. The choices were given in the form of a five-point Likert scale (strongly disagree to strongly agree). It was interesting to note that a majority of respondents expressed agreement (agreed or strongly agreed) that they were spending more time outdoors in the Spring (60.6%) survey, than in the Fall (48.6%). At the same time, a smaller percentage (19.5%) of Fall respondents disagreed (disagree or strongly disagree) than Spring (21.9%).

This may have been due to the fact that the initial move off-campus may have seemed more like a break rather than a long-term change. By the end of the Fall, students may have adjusted their work and life schedules for what might have been perceived as a long-term change, allowing less time outdoors. A chi-square analysis indicated a significant difference between the responses of the two groups (significance=0.000).

TABLE II: INCREASED TIME SPENT OUTDOORS

Semester	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Spring 2020	18 (6.7%)	41 (15.2%)	47 (17.5%)	98 (36.4%)	65 (24.2%)
Fall 2020	20 (6.2%)	41 (12.7%)	105 (32.5%)	124 (38.4%)	33 (10.2%)

*n(%).

**Significance level 0=.000.

Objective #3 was to assess the impact of the pandemic on students' weight.

Students could select three choices for describing the impact of the order on their weight – lost weight, maintained their weight, or gained weight. An interesting finding was that in Spring, the same percentage of students (22.9%) reported losing weight as gaining weight. And this was in only a few weeks after the order's impact. Slightly more than one-half (54.2%) maintained their weight. At the end of the Fall, 93 students (28.1%) reported gaining weight as opposed to 71 students (21.7%) who reported losing weight. Approximately one-half of Fall respondents reported maintaining their weight.

TABLE III: CHANGES IN WEIGHT

Semester	Lost Weight	Maintained Weight	Gained Weight
Spring 2020	63 (22.9%)	149 (54.2%)	63 (22.9%)
Fall 2020	71 (21.7%)	164 (50.2%)	93 (28.1%)

*n(%).

**No significant difference.

As one might expect given the close percentages, the Pearson Chi-square statistic revealed no significant differences between the responses to the Spring and Fall surveys.

Objective #4 was to determine the impact of the order over time, on the perceptions of students, as the impact of the order on their physical health.

The statement used to assess objective #4 was also based on a 5-point Likert scale, ranging from strongly disagree to strongly agree. The data indicated a slightly larger percentage of students expressed agreement that their physical health had improved. In Spring (35.1%) felt it had improved compared with Fall (29.6%). More than one-fourth (26.4%) of respondents in Spring disagreed with the notion their health had improved, while 32.4% of Fall respondents disagreed with the notion. The 0.184 chi-square test statistic indicated the response levels were not statistically different between the two groups.

TABLE IV: MY PHYSICAL HEALTH HAS IMPROVED

Semester	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Spring 2020	17 (6.3%)	54 (20.1%)	103 (38.4%)	65 (24.3%)	29 (10.8%)
Fall 2020	33 (10.2%)	72 (22.2%)	123 (38.0%)	75 (23.1%)	21 (6.5%)

*n(%).

**No significant difference.

Objective #5 was to determine whether students felt their families had become closer after the stay-at-home order. The

importance of this variable centers on the fact that a close family relationship provides emotional support improves economic well-being and increases overall health (Unite for Sight 2022). Reports of close family ties thus can be indicative of an improved health outlook.

Of the spring respondents, a majority of respondents (54.9%) expressed agreement (agree or strongly agree) with the concept that their family had grown closer after the order. In Fall, less than one-half (42.4%) of respondents reported their families had grown closer. At the other end of the spectrum, 12% of Spring respondents and 17% of Fall respondents did not feel their families had grown closer after the order.

TABLE V: MY FAMILY HAS GROWN CLOSER

Semester	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Spring 2020	7 (2.6%)	25 (9.4%)	88 (33.1%)	100 (37.6%)	46 (17.3%)
Fall 2020	24 (7.4%)	31 (9.6%)	131 (40.6%)	108 (33.4%)	29 (9.0%)

*n(%).

**Significance level = 0.002.

It appears in the short run; a larger percentage of respondents felt their families had grown closer than in the long run. As one might surmise given the spread between these percentages, a chi-square test revealed significant differences between the Spring and Fall responses to the question.

Objective #6 concerned student perceptions as to whether they had grown closer to their friends. An improved health outlook arising from a close and supportive family structure can also arise from a close and supportive social structure (friends). Maintaining strong social bonds, especially from a young age, can improve one's health and result in an increased life expectancy (Bergland, 2016).

Table VI displays the findings for this variable. In Spring, 27.8% expressed agreement with the concept they had grown closer to their friends. In Fall, that percentage increased to 34.1%. Spring had 29.3% express disagreement (disagree or strongly disagree) with the concept while a smaller percentage (23.8%) felt that way in Fall.

TABLE VI: I HAVE GROWN CLOSER TO MY FRIENDS

Semester	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Spring 2020	18 (6.7%)	61 (22.6%)	116 (43.0%)	60 (22.2%)	15 (5.6%)
Fall 2020	34 (10.5%)	43 (13.3%)	136 (42.1%)	89 (27.6%)	21 (6.5%)

*n(%).

**Significance level = 0.020.

It is interesting to postulate, that as time under the order dragged on, students began getting out to see their friends and socialize. Perhaps in the early days of the order, students were more cautious as so much uncertainty existed. As time went on, perhaps students began venturing out and their socialization activities grew.

Objective #7 inquired as to student level of optimism after the order. Table 7 displays data relative to the question of the

level of optimism about the future. Not surprisingly, as the order continued, more respondents began to feel a decreased level of optimism about the future. At the end of the Spring semester, 32.7% reported a decrease in optimism. By the end of the Fall, a majority (54.4%) reported a decreased level of optimism. Optimism is included in this study as one's optimism can impact one's health.

TABLE VII: LEVEL OF OPTIMISM ABOUT THE FUTURE

Semester	Increased	Stayed the Same	Decreased
Spring 2020	60 (21.8%)	125 (45.5%)	90 (32.7%)
Fall 2020	74 (22.6%)	113 (34.5%)	141 (54.4%)

*n(%).

Significance level = 0.013.

According to Kim *et al.* (2017), optimism has been linked to a lower level of poor health outcomes, especially cardiovascular disease. A generalized expectation that good things will happen (referred to as dispositional optimism) — is linked to reduced risks of chronic health conditions, especially vascular factors and disease (Kim *et al.*, 2017). Similarly, Rozanski *et al.* (2019) report that optimism was significantly associated with a lower risk of all-cause mortality. The impact of optimism on health cannot be understated. The decrease in optimism reported in the latter survey of students is cause for concern.

Objective #8 inquired as to whether students felt their mental health had deteriorated after the order. Again, using a 5-point Likert Scale, students were asked if their mental health had deteriorated since the stay-at-home order was implemented. Table 8 provides data from the two surveys. Fall respondents reported a higher level of agreement (41.8%) than Spring respondents (33.9%). At the same time, Spring data indicates that 35.1% of respondents disagreed with the notion their mental health had deteriorated, while 26.3% of Fall respondents felt that way.

TABLE VIII: MY MENTAL HEALTH HAS DETERIORATED

Semester	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Spring 2020	39 (14.4%)	56 (20.7%)	84 (31.0%)	63 (23.2%)	29 (10.7%)
Fall 2020	29 (9.0%)	56 (17.3%)	103 (31.9%)	85 (26.3%)	50 (15.5%)

*n(%).

**Significance level = 0.101 (not significant).

As for the mental health question, the overall difference (0.101) was just outside of the significance expectation. It appears that the time under the order was having an impact. The impact was not a good one.

Finally, Objective #9 inquired whether respondents felt stronger after the order. A larger percentage (39% in Fall vs 35% in Spring) of the Fall group agreed they felt stronger since the order. On the other hand, in Fall, 21.3% of spring respondents disagreed with feeling stronger while 18.9% of Spring respondents disagreed, they felt stronger after the order.

TABLE IX: I AM A STRONGER PERSON

Semester	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Spring 2020	11 (4.1%)	40 (14.8%)	125 (46.1%)	72 (26.6%)	23 (8.5%)
Fall 2020	34 (10.5%)	35 (10.8%)	128 (39.6%)	92 (28.5%)	34 (10.5%)

*n(%).

**Significance level = 0.016.

The differences between the Spring and Fall groups regarding feeling stronger after the order was significant at the 0.016 level. It appears that as time progressed, students were feeling stronger.

V. SUMMARY AND RECOMMENDATIONS

It is apparent the pandemic impacted students and their health. The impacts of the pandemic on student health varied according to the results of the surveys. While some findings may have been as expected, some findings were surprising. Some students reported spending more time exercising after the order than before. Spring respondents were slightly more likely to report exercising more than Fall respondents. Similarly, a larger percentage of Spring respondents reported spending more time outdoors than did their Fall counterparts.

At the end of the Spring semester, the percentage of students who reported gaining weight was the same percentage as those reporting they lost weight. As the pandemic continued, a slightly larger percentage of students reported gaining weight in the Fall. Perhaps not surprisingly, a larger percentage of students reported their physical health had improved.

Perplexing to some was the finding that Spring students were more likely to report they felt closer to their families than Fall students. This may have been due to the fact that as time went on, closeness had become too close for some. Interestingly, students at the end of Fall felt they were growing closer to their friends. Perhaps after the initial shock of being sent home and isolating, by the end of Fall, students were getting out more and socializing once again.

Sadly, at the end of Fall, a larger percentage of students reported their mental health had deteriorated. Similarly, optimism for the future had reportedly declined more for Fall respondents than Spring respondents

As a final, positive observation, a larger percentage of Fall respondents reported feeling strong as opposed to Spring respondents. After six months of health concerns and social isolation, students at least by some measures appeared to be coming back.

The long-term health impacts of the pandemic on students remain to be seen. At this time, approximately 90% of colleges and schools have welcomed students back to campus (Moody, 2022). However, the appearance of new strains of the coronavirus presents a continuing impediment to normalcy. The need to monitor the continuing impact of the pandemic on student health is apparent.

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