

Three Semesters in: COVID's Impact on the Health and Well-being of Students over Three Semesters of the Health Emergency Order Concerning the Pandemic

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ABSTRACT

Health impacts of COVID-19 are many. COVID-19 manifested itself through a variety of symptoms, resulting in illnesses, debilitations, and too often death. The serious nature of the virus became clear as the number of infections and deaths rose, economies contracted, and governments began issuing public health emergencies with coincident stay-at-home mandates. Pandemic impacts on student health resulting from the move to online education amid a public health emergency are discerned over the course of three semesters.

Keywords: COVID-19, emergency health order, health, pandemic, students.

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I. INTRODUCTION

Organizations worldwide were forced to curtail or alter their activities due to the pandemic. Employees deemed essential and working in organizations deemed essential were expected to continue operations, but others, including universities, were expected to restrict efforts and follow orders emanating from local, state, regional and national authorities. Educational institutions, including primary schools, secondary schools, colleges, and universities, were expected to continue educating students, albeit using safer, distance-based technologies.

A new term, "super-spread event" arose overnight. Events early in the pandemic where infected participants tended to infect many others were identified. Events, including funerals, family gatherings, gym classes, and choir practices, have all spawned dangerous outbreaks (Lewis, 2021). Larger events were also seen as super spreaders. Mackel (2021) posited that Mardi Gras in New Orleans, which had not been cancelled in 2020, had been a super spreader event as 50,000 infections were reported weeks after the celebration. Ballard and Karlin (2020) noted Louisiana was experiencing the fastest spread of the virus in the U.S., so the state's governor quickly issued orders relative to a public health emergency with attendant stay-at-home expectations.

The pandemic (which continues on a smaller scale) witnessed changes in educational delivery, business activities, personal relationships, health and crime. For instance, certain types of crimes decreased while other types

of crime—notably domestic violence—increased (Levenson, 2021). It is posited domestic violence may have increased due to the close proximity and isolation of potential abusers with their victims. Homicides rose, especially in major cities. Los Angeles experienced a murder increase of 30%. New York City had a 40% increase in murders, while not to be outdone, Chicago recorded a 50% increase (Corley, 2021). Further, stressful situations impacted the health of many.

It appears stress impacted all ages. Children were impacted despite the fact that they were less likely to become seriously ill. While emergency room visits decreased during the pandemic, some types of health emergencies increased (Sudhakar, 2022). Sudhakar noted self-harm increased by 50% and overdose/poisonings increased by 70%. Visits to mental health professionals increased by 60% (Sudhakar, 2022). Adolescents seeking help for eating disorders doubled (Sudhakar, 2022). While many problems occurred, surprisingly, it appears suicide rates did not increase until 2021 (CDC, 2022). But ominously, a potential increase in suicides among persons suffering from long-covid is currently being investigated (Steenhuysen & Rigby, 2022). So, there is still significant concern relative to suicide.

Pre-pandemic, the suicide rate among college students was lower overall than the suicide rate for the general population (New, 2015b). However, the reported findings of one study indicated that the emotional health of incoming freshmen in 2014 was at its lowest level ever, that 10% of freshmen reported feeling depressed frequently (New, 2015a), and the finding of suicides among middle school-aged children exceeded deaths from traffic accidents (Reuters, 2016) is a

troubling portent for higher education in the best of times. Indeed, by 2022, suicides were reported to be the second leading cause of death among 15 to 24-year-olds (Cohen, 2022).

Health-related changes were not the only areas to witness change during the pandemic. Reading and writing changes were reported (H. L. Budden *et al.*, 2021). Shopping behaviors changed (M. C. Budden *et al.*, 2021). Wyld *et al.* (2020) noted the retail apocalypse, which had begun years earlier, worsened as stores were avoided and shoppers turned online for their needs. The closure of approximately 100,000 stores by the end of August 2020 bears witness to the move away from brick-and-mortar stores owing to the changing economic environment (Sraders & Lambert, 2020; Yelp, 2020).

Payment methods for purchases changed. The old saying, “Cash is king”, was lost on many. Apple Pay, which recorded an 85% increase in use, was not alone in recognizing the move away from cash. Evans reported the use of BNPL (buy now–pay later) rose by approximately 90% (2020). Indeed, the continued popularity of BNPL has attracted many new players, including Apple (Andriotis, 2022; Lee, 2021). And, as Pastore (2021) points out, people using BNPL often buy more, perhaps perceiving the impact of the purchase as less since they pay no interest and do not have to go through a credit check.

The pandemic witnessed an increased use of distance education (Budden *et al.*, 2022), with consequences that were not all positive. Students in K-12 fell behind in math and reading (Dorn *et al.*, 2021). If social distancing and distance education negatively impact the learning process of young students, the resulting long-term isolation of college students may be a cause for concern relative to outcomes related to health. The situation begs the question - did COVID-19 and attendant stay-at-home orders impact students’ health or health outcomes over time?

This study involves health-relevant questions administered at the end of three semesters during the pandemic (Spring 2020, Fall 2020, and Spring 2021) at a university in the southeast U.S. This analysis continues looking at the health impacts of the continuing pandemic preliminarily reported over two semesters previously (see Budden *et al.*, 2022). The independent, convenient surveys were administered in junior/senior and graduate business classes at the end of each of these three pandemic (stay-at-home) semesters.

II. OBJECTIVES

There were ten specific variables investigated in the study. At the end of each of the three semesters, after the order was issued, students were questioned about their perceptions relevant to variables of interest since the stay-at-home order was issued in March 2020. The perceived impacts of the pandemic on the following specific objectives were analyzed:

- 1) To determine the impact of the pandemic/health order on the number of people with whom students socialized.
- 2) To determine the impact of the pandemic/health order on the amount of time students spend at work.
- 3) To determine the impact of the pandemic/health order

on the amount of time students spent with their families.

- 4) To determine the impact of the pandemic/health order on the amount of time students spent with their significant others/spouses.
- 5) To determine the impact of the pandemic/health order on the amount of time students spent exercising.
- 6) To determine the impact of the pandemic/health order on student perceptions of strength.
- 7) To determine the impact of the pandemic/health order on student perceptions of how they felt about their families.
- 8) To determine the impact of the pandemic/health order on perceptions of students’ physical health.
- 9) To determine the impact of the pandemic/health order on the amount of time students spent outside.
- 10) To determine the impact of the pandemic/health order on perceptions of students’ mental health.

III. METHODOLOGY

Students were sent home in March 2020, and classes went remote. Students were still remote full-time in Fall 2020. During Spring 2021, some classes resumed on campus, while the majority stayed online. While limited social gatherings (and limits on in-person class attendance) were phasing in, health mandates including masks and social distancing continued. At the end of each of these semesters, 8–10 business classes at the junior, senior and graduate levels were surveyed. The survey resulted in a large convenience sample each semester.

The questionnaire and survey methodology were approved by the University’s Research Committee. The university’s process mandates that students may opt out of answering any or all questions and that the questionnaires are administered in an anonymous manner. Surveys were conducted during the last two weeks of each semester via Survey Monkey. A Chi-Square test was conducted among the three semesters for the variables of interest. Results and significance levels are noted.

IV. FINDINGS

6 of the 10 variables revealed statistically significant findings of differences between the semesters’ responses using Chi-Square analysis. Four of the variables indicated no significant differences between the semesters’ responses.

Variable statements 1–5 allowed respondents to indicate if their perceptions had decreased, stayed the same or increased since the order. Variable statements 6–10 used a 5-point Likert Scale, ranging from strongly disagree to strongly agree. However, to make it easier to interpret, responses of strongly disagree and disagree were aggregated, as were strongly agree and agree. So, in the final analysis, there were three choices—disagree (at least), neither agree nor disagree, and agree (at least).

A. Objective 1: To Investigate the Impact of the Order on the Number of People Students Socialized with After the Order

There was a difference in responses (Table I) relative to the

number of people students socialized with since the order was issued. Responses indicated students began to socialize more as the pandemic continued. Indeed, almost 63% of students during the first survey indicated the number of social interactions had decreased, while in the third administration, only about one-third (33.6%) indicated such was the case. At the same time, the percentage of respondents who indicated an increase in social interactions increased each semester, more than doubling, from 7.4% to 15.9%.

TABLE I: SOCIALIZATION AFTER THE ORDER

Semester	Decreased	Stayed the same	Increased
Spring 2020	178 (62.9%)	84 (29.7%)	21 (7.4%)
Fall 2020	151 (44.9%)	154 (45.8%)	31 (9.2%)
Spring 2021	91 (33.6%)	137 (50.6%)	43 (15.9%)
Total	420 (47.2%)	375 (42.1%)	95 (10.7%)

Note: n (row %)/Significance = 0.

As noted by Umberson and Karas Montez (2010), the quality and quantity of social relationships have been clearly linked to mental health, health behavior, physical health, and mortality risk. Social ties and the resulting interactions and their influence on health have been studied greatly. Health behaviors are personal behaviors that either promote or hinder health, morbidity, and mortality, and social interactions have been closely tied to these health behaviors. Umberson *et al.* (2010) provide a review of the research evidence to support this connection. Other studies have attempted to directly observe social interactions in order to determine the impact face-to-face contact had on stress and other mental health indicators. Ono *et al.* (2011) determined that there was a negative correlation between social interactions and stress, suggesting that stress was reduced by quality social interactions. Indeed, Bergland (2016) discusses how social bonds can increase one's life expectancy through an improved health outlook. Unfortunately, the pandemic exacerbated social disconnections (Cohen, 2022).

B. Objective 2: To Investigate the Impact of the Order on the Amount of Time Spent at Work

With similar patterns of results of Objective 1, Objective 2 found the amount of time students spent at work increased as time went on. The percentage of students who indicated a decrease in the amount of work fell from 51.5% to 13.7% in the third semester (See Table II).

TABLE II: TIME AT WORK

Semester	Decreased	Stayed the same	Increased
Spring 2020	133 (51.2%)	66 (25.4%)	61 (23.5%)
Fall 2020	78 (24.5%)	121 (38.1%)	119 (37.4%)
Spring 2021	35 (13.7%)	106 (41.4%)	115 (44.9%)
Total	246 (29.5%)	293 (35.1%)	295 (35.4%)

Note: n (row %)/Significance = 0.

In contrast to this study, Aucejo *et al.* (2020) surveyed 1,500 students at a major university in the United States in April 2020 to determine how COVID-19 had impacted their educational and experiential goals. It was determined that 13% of students have delayed graduation, 40% have lost a job, internship, or job offer, and 29% expect to earn less at age 35. Their research indicated these results may be significantly influenced by socioeconomic status and academic success. Less affluent and non-honors students tended to suffer the most. Comparable results were observed

by Tsurugano *et al.* (2021) around this same time period. Specifically, from March 2020 to April 2020, the number of students working fell by 46%. However, it is important to note the data indicates students will be returning to work by 2021.

C. Objective 3: To Investigate the Impact of the Order on the Amount of Time Spent with Their Families

It has been found that close family relationships can be good for one's health (Unite for Sight, 2022). Comparing the responses by semester (Table III), there was a significant difference in responses. The first semester witnessed the largest percentage (66.4%) of students who reported spending more time with their families.

TABLE III: FAMILY TIME

Semester	Decreased	Stayed the same	Increased
Spring 2020	44 (15.5%)	51 (18.0%)	188 (66.4%)
Fall 2020	60 (18.2%)	112 (34.0%)	157 (47.7%)
Spring 2021	41 (15.2%)	77 (28.6%)	151 (56.1%)
Totals	145 (16.5%)	240 (27.2%)	496 (56.3%)

Note: n (row %)/Significance = 0.

D. Objective 4: To Investigate the Impact of the Order on the Amount of Time Spent with Their Significant Other/Spouse

Closely related to objective #3, objective #4 asked about the amount of time students spent with significant others/spouses. Again, Chi-Square indicated a difference existed between the semester responses (Table IV). While the percentage who reported the time increased remained close (52.1%, 53.9% and 52.9%) each semester, the big difference appears to be in the percentage reporting a decrease in time spent. In that response category, the percentage declined for each measure, from 18.9% to 7.7%). Again, healthy relationships can lead to healthier lives.

TABLE IV: TIME WITH SIGNIFICANT OTHER/SPOUSE

Semester	Decreased	Stayed the same	Increased
Spring 2020	41 (18.9%)	63 (29.0%)	113 (52.1%)
Fall 2020	25 (9.7%)	94 (36.4%)	139 (53.9%)
Spring 2021	17 (7.7%)	87 (39.4%)	117 (52.9%)
Totals	83 (11.9%)	244 (35.1%)	369 (53.0%)

Note: n (row %)/Significance = 0.002.

E. Investigate the Impact of the Order on the Amount of Time Spent Exercising

A real effort to impact health after impact of the stay-at-home order, would be the amount of time spent exercising. It appears the amount of exercise was not tied to the semester. The percentage of students who reported more time spent exercising ranged from 25.5% to 31.8%. The percentage who reported spending less time exercising ranged from 10.6% to 12.4% (see Table V). The percentage of respondents who indicated no change in the amount of time exercising ranged from 57.7% to 62.2%.

TABLE V: TIME SPENT EXERCISING

Semester	Decreased	Stayed the same	Increased
Spring 2020	29 (10.6%)	158 (57.7%)	87 (31.8%)
Fall 2020	34 (10.7%)	195 (61.1%)	90 (28.2%)
Spring 2021	33 (12.4%)	166 (62.2%)	68 (25.5%)
Totals	96 (11.2%)	519 (60.3%)	245 (28.5%)

Note: n (row %)/Significance = 0.576.

As might be expected from such close dispersions, there

was no significant difference between the three measures (Table V). These results are similar to observations by Brand *et al.* (2020) who surveyed 13,696 individuals from 18 countries and determined that the exercise frequency was not negatively affected by stay-at-home orders. In their research, they noted “that 44.2% of the participants reported no change, 23.7% reported a decrease, and 31.9% reported an increase in their exercise frequency during the coronavirus pandemic” (p1). Constandt *et al.* (2020) also noted that those individuals exercising with family or friends prior to the lockdown had a higher likelihood of maintaining this level of activity. Those without these relationships or other online support for exercise were less likely to attain a higher exercise category. Fig. 1 provides the overall responses to variables/objectives 1–5. Overall, the student’s perception of the impact of the pandemic/health decreased from 31.8% in the Spring 2020 to 16.5% in Spring 2021 with respect to time spend socializing, working, time spend with families and relatives, and time spend exercising.

F. Objective 6 Statement: I Am a Stronger Person since the Stay-At-Home Order

As mentioned earlier, this statement was measured using a Likert Scale. While there were differences, it appears the percentage who agreed they were stronger increased each semester—from 35.1% to 41.1%. The percentage who disagreed felt stronger, sadly also rose each semester - from 18.8% to 21.9% (Table VI).

TABLE VI: I AM A STRONGER PERSON

Semester	Disagree	Neither Agree/Nor disagree	Agree
Spring 2020	51 (18.8%)	125 (46.1%)	95 (35.1%)
Fall 2020	69 (21.4%)	128 (39.6%)	126 (39.0%)
Spring 2021	58 (21.9%)	98 (37.0%)	109 (41.1%)
Total	178 (20.7%)	351 (40.9%)	330 (38.4%)

Note: n (row %)/Significance = 0.289.

While it is encouraging to see the percentage rise as to those who felt stronger the longer the pandemic lasted, it was discouraging to also recognize the percentage who felt they were not stronger also rose. The percentage of negative responses may be a harbinger for mental health measures later.

G. Objective 7 Statement: Since the Stay-At-Home Order, My Family Has Grown Closer

A close family relationship is an important contributor to one’s health. The quality of family relationships can influence well-being through psychosocial, behavioral, and physiological pathways (Thomas *et al.*, 2017). Thus, a close family relationship may positively impact one’s health. Objective 7’s finding indicates a significant difference among the three semesters’ responses. In Spring 2020 a majority of respondents reported an increase in family closeness. In the second semester, a significant drop in agreement occurs. In the third semester, the percentage agreement increases over the second semester but still fails to have a majority of respondents agree. In the short run, staying home improved the family relationship. As time went on, those same relationships may have become strained due to too much closeness.

TABLE VII: FAMILY HAS GROWN CLOSER

Semester	Disagree	Neither agree/Nor disagree	Agree
Spring 2020	32 (12.0%)	88 (33.1%)	146 (54.9%)
Fall 2020	55 (17.0%)	131 (40.6%)	137 (42.4%)
Spring 2021	44 (16.6%)	93 (35.1%)	128 (48.3%)
Total	131 (15.3%)	312 (36.5%)	411 (48.1%)

Note: n (row %)/Significance = 0.041.

H. Objective 8 Statement: Since the Order, My Physical Health Has Improved

Similarly, to the results of Objective 7—Objective 8 had a larger percentage of respondents agree their physical health had improved in the near term rather than in subsequent semesters (see Table VIII). Over 35% in the Spring 2020 reported an improvement in physical health. That fell to 29.6% in the Fall and rose in Spring 2021. It appears respondents felt their health improved in the short run, began to deteriorate in the second measure, but rebounded in Spring 2021. Overall, 29.7% disagreed that their health had improved during the COVID-19 pandemic.

TABLE VIII: MY PHYSICAL HEALTH HAS IMPROVED

Semester	Disagree	Neither agree/Nor disagree	Agree
Spring 2020	71 (26.5%)	103 (38.4%)	94 (35.1%)
Fall 2020	105 (32.4%)	123 (38.0%)	96 (29.6%)
Spring 2021	79 (29.7%)	100 (37.6%)	87 (32.7%)
Total	255 (29.7%)	326 (38.0%)	277 (32.3%)

Note: n (row %)/Significance = 0.538.

I. Objective 9 Statement: I Have Increased the Amount of Time I Spend Outside

Spending time outside can be a healthy experience as one is exposed to sunlight. Sunlight is a major source of vitamin D—a necessary nutrient for bone health (Mayo Clinic, 2021). Vitamin D helps boost bone health as it increases the absorption of calcium from the diet (NDTV, 2021). In the short term, more respondents reported spending time outside than in later semesters. There is a significant difference between the semesters as seen by an agreement level of 60.6% in Spring 2020 that fell to 47.9% in Spring 2021 (shown in Table IX).

TABLE IX: AMOUNT OF TIME SPENT OUTSIDE INCREASED

Semester	Disagree	Neither Agree/Nor disagree	Agree
Spring 2020	59 (21.9%)	47 (17.5%)	163 (60.6%)
Fall 2020	61 (18.9%)	105 (32.5%)	157 (48.6%)
Spring 2021	56 (21.1%)	82 (30.9%)	127 (47.9%)
Total	176 (20.5%)	234 (27.3%)	447 (52.2%)

Note: n (row %)/Significance < 0.001.

J. Objective 10: Since the Stay-At-Home Order, My Mental Health Has Deteriorated

The findings on mental health impact were concerning. More than 1/3 of each semesters’ respondents indicated their mental health had deteriorated (see Table X). Indeed, overall, 37.8% agreed their mental health had deteriorated. While respondents were not adolescents (10–19 years of age), one study of adolescent suicide rates during the pandemic noted suicide rates varied among the states investigated, but the proportion overall of suicides among adolescents increased

during the pandemic (Charpignon *et al.*, 2022). College students' suicide rates are becoming alarming-even among athletes. Indeed, Hensley-Clancy (2022) reports on five college athlete suicides in recent months. Clearly, the finding that 37.8% indicated their mental health had declined is a call for vigilance and action.

TABLE X: MY MENTAL HEALTH HAS DETERIORATED

Semester	Disagree	Neither agree/Nor disagree	Agree
Spring 2020	95 (35.1%)	84 (31.0%)	92 (33.9%)
Fall 2020	85 (26.3%)	103 (31.9%)	135 (41.8%)
Spring 2021	80 (30.2%)	87 (32.8%)	98 (37.0%)
Totals	252 (30.3%)	274 (31.9%)	325 (37.8%)

Note: n (row %)/Unbroken Significance = 0.176.

Overall, the student's disagreement of the impact of the pandemic/health remained basically the same from 23.2% in Spring 2020 to 23.9% in Spring 2021 with respect to their personal being, strength of their family relationship, their physical health, the amount of time spends outside, and deterioration of their mental health.

V. SUMMARY AND RECOMMENDATIONS

By any measure, the pandemic was a game changer. Health was impacted on a large scale, worldwide. Education was impacted. By no means should the educational crisis demonstrated by the COVID-19 pandemic be absent from any analytical consideration. The statistical information available, without a doubt, can help us rethink new scenarios and policies that we can apply in future cases should the need arise.

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