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## Special Issue on COVID-19 Projects and Research from Eta Sigma Gamma Chapters

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# The Health Education Monograph Series

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*Robert J. Bensley, PhD, MCHES*
*Jodi Brookins-Fisher, PHD, MCHES, FESG*
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Guest Editors

Close your eyes and step back to the end of February 2020. Universities were operating as normal, with most getting ready for a long-awaited spring break. Sure, we had heard of and been following the new virus that had evolved out of China, but like we had experienced in the past with other potential concerns such as Zika, Ebola, MERS, and the rest, many of us weren't too concerned. Fast forward 24 months and we are now in a place where our world has been uprooted. Over 480 million cases and 6 million deaths later it is evident that what we loosely followed two years ago actually became the nightmare we never imagined could happen. And along the way we discovered a new reality. Forever in our vernacular are terms like "Zoom" and "bubble" and "N95" and "face coverings" and "gaiters" and "social distancing". We have learned much as we continue to work through this pandemic. And that is focus of this special issue of the *Health Education Monograph*.

We invited our Eta Sigma Gamma university chapters to submit work they have been doing associated with COVID-19. Our call encouraged Gammans to submit commentaries, research, and class projects or papers that focus on COVID-19 issues and mitigation strategies. Of the 10 submissions we received, 8 were found to be appropriate for this special issue. Represented are eight Eta Sigma Gamma chapters: Eta, Kappa, Omega, Gamma Mu, Gamma Pi, Delta Chi, Epsilon Omicron, and Epsilon Psi. These chapters are associated with Central Michigan University, State University of New York at Cortland, Illinois State University, Western Michigan University, Hofstra University, Texas State University, California Baptist University, and the University of Indianapolis.

Eighteen student authors are featured in this issue. First, we look at the impact COVID-19 has had on university students. Briggs begins this issue with a commentary sharing her frustrations of misdiagnosis during the early stages of the pandemic. Oberoi and Malizia then report the impact COVID-19 has had on social and emotional dimensions of wellness. Levy finishes this first group of articles with a study of COVID-19 and its relationship to food security and fruit and vegetable consumption.

The second focus of this issue is on COVID-19 mitigation strategies. Tuller explores the COVID-19 response plans at the public universities in Michigan. Mundt, Morgan, Reiss, Carone, Kulasniak, and Glunz, representing three different chapters, share a multi-university study on attitudes associated with face coverings. Giem shares results of the CDC MASCUP! mask wearing surveillance project on her campus. The graduate student trio of Herrera, Marron, and Ordonez focus on factors associated with vaccine hesitancy. We conclude this issue with Yelsma, Mitchell, and Filpi describing the process they followed in establishing and implementing a COVID-19 student coalition. As guest editors, we hope you enjoy reading this issue and take from it strategies or ideas that can be implemented in your chapter.

None of this could have been accomplished without the guidance of dedicated chapter sponsors, who assisted our student authors in bringing their work to fruition, as well as our volunteer manuscript reviewers. We thank all who were involved in bringing this issue to fruition.

HEALTH EDUCATION MONOGRAPH SERIES

# Misdiagnosis During the COVID-19 Pandemic: When You Hear Hoofbeats, Don't Look for Zebras

Abby M. Briggs
Hofstra University

**Abstract**

Since taking center stage in the United States in March 2020, the COVID-19 pandemic has touched every aspect of life. For example, the job of physicians, surgeons, nurses, and other healthcare professionals has changed to adapt to the needs of the pandemic. This commentary provides first-hand insight into the other side of the story, at how being a patient and receiving health care has been changed by the pandemic. Fears about transmission in the earlier months of the pandemic resulted in other possible illnesses being overlooked, while extending the time until diagnosis, and possibly extending patient suffering. In the pandemic and post-pandemic world, patient advocacy and education are more important than ever in ensuring that a timely diagnosis is made, and patients receive the care they deserve.

*Ibraheem M. Karaye*
GAMMA PI
CHAPTER SPONSOR

Fear. Stress. Anxiety. These three feelings incite a physical reaction in our bodies. Cortisol levels rise. Heart rate and blood pressure increase. There may be dizziness, headaches, digestive problems. Our immune system is weakened, which can create a vicious cycle — being stressed about being sick makes our immune system vulnerable to disease, which increases our likelihood of falling ill. Fortunately, modern medicine through imaging, laboratory testing, and other technologies, facilitates the early detection and treatment of disease.

But what happens when you don't know why you're sick? What happens when you must wait for answers? What happens when you throw a pandemic into the mix? How does that have an impact on healthcare and answers for patients? I learned the answers to these questions in the summer of 2020.

On the morning of June 22nd, I woke up with a fever. It was a low fever, around 99.4° F, but it rose throughout the day and was accompanied by a headache. I had tossed and turned all night, having lucid dreams, and switching between hot and cold. I was tired, fatigued, and mostly scared. Because the pandemic was still a major concern, I immediately scheduled a COVID-19 test. The earliest available appointment was the next day. So, on June 23rd, I was tested for COVID-19 via a throat swab. Test results were uploaded to an online portal, which meant that I had to create an account and wait three business days for the account to be activated.

June 24th was one of the worst days of my summer. My fever remained at 103°F all day, peaking at 103.4°F. All I could do was lay in bed and think about my sickness. My physician's office would not let me come in until I had my COVID-19 test results back. But I could not get my COVID-19 test results until my account was activated and I was notified that the results were uploaded.

By the end of the week, on June 26th, I still had not received an email notifying me that my account had been activated. My fever had not subsided, I was having trouble sleeping, and I had a terrible headache that morning. I felt incredibly disheartened to not be feeling any better, but more so that I still didn't have any answers as to why there hadn't been a change. So, I called the testing facility's customer service, and a kind woman activated my account over the phone. After four days, I finally had my COVID-19 test

result, which turned out negative. To my frustration, however, the portal indicated that my result had been uploaded *the day of my test*. I could have been saved four days of anxiety and stress. I could have visited my physician's office or an urgent care. My road to recovery had been delayed by a small bureaucratic step. And if I had not called customer service, the wait time would have been delayed even further.

The following day, June 27th, I visited a walk-in clinic, and the physician on duty referred me to an urgent care facility. The urgent care physician listened to my symptoms — fever, fatigue, sore throat, and occasional headache, but no coughing or difficulty breathing. I let them know I had already tested negative for COVID-19, but the physician insisted I obtain a second COVID-19 test from their facility. This test was via a nose swab. The physician also prescribed antibiotics for a potential sinus infection.

It took eight days to receive my urgent care COVID-19 test results. Again, it was negative. I waited for the antibiotics to relieve my symptoms, but my fever never subsided, and my sore throat only got worse. On July 5th, I finally took a reading light and visualized my throat myself, only to find what looked like little white bugs all over my right tonsil. I immediately burst into tears. I was completely overwhelmed, frustrated, tired, and terrified. I had been bedridden and sick for two weeks. I had not been getting better and now I was getting worse?

That same day, I went back to the urgent care, enraged. I wanted answers and was not going to leave until I got them. I saw a different physician, and thankfully, they did not request another COVID-19 test. Instead, I was tested for streptococcus pharyngitis and mononucleosis (mono). Sure enough, mono came back positive. I was also diagnosed with tonsillitis (no bugs in my throat, just a viral infection). The antibiotics that the first urgent care physician had prescribed are known to negatively interact with mono patients. Not only did the physician delay my diagnosis by requesting another COVID-19 test, but they also prescribed a medication that likely did more harm than good.

My month-long fever finally subsided around mid-July. The tonsillitis had started on my right tonsil but soon affected my left tonsil on July 8th, which continued through late July/early August. My fatigue persisted until the end of August. The highlight of my day was going for a walk with my younger sister and sometimes my boyfriend if he was around visiting. I started with just walking to the mailbox and back — anything further felt impossible — then the small block, then the medium block, until I could finally walk around the full neighborhood block (~1 mile).

Although I never had COVID-19, I know that it influenced every part of my journey to finally obtain a diagnosis. My initial stress and concern were that I had COVID-19. More stress and anxiety were brought on by waiting for the COVID-19 test results. The walk-in clinic physician passed me off because of concerns about a possible COVID-19 diagnosis despite a negative test result. The urgent care physician did not consider other possibilities, as COVID-19 was a prominent issue and seemed like the answer. It took two negative test results and two weeks of fear, fatigue, and a fever that never subsided before a physician even considered a diagnosis other than COVID-19.

Throughout the pandemic, this scenario has been played out in physicians' offices and emergency rooms. While it is too early to comprehend the full extent of misdiagnosis from concerns about COVID-19, several case reports and case series have been published that indicate this phenomenon has indeed been occurring (Scopelliti et al., 2020; Yousefzai & Bhimaraj, 2020). For example, Snapiri and colleagues (2020) published a case series on seven pediatric patients with delayed diagnosis of appendicitis. Along with delayed diagnosis, they found higher complication rates during the COVID-19 era compared to a similar period in the previous year. Just like my experience, these patients' pain and distress were prolonged and even made worse because concerns about the pandemic caused physicians to misattribute symptoms and misinterpret test results.

My biggest takeaway from this experience is the importance of advocacy and patient education. I was fortunate enough to have previously been an intern for a patient safety and advocacy organization, so I knew what I needed to do before, during, and after appointments with physicians. When I realized my fever was not subsiding during that first week of sickness in June, I began documenting all my symptoms daily. I brought the notebook with me to each appointment, took notes on what the physician told me, and asked them questions about my diagnosis and treatment plan. And yet, it was difficult to make my voice heard when COVID-19 was at the forefront of everyone's mind. While concerns about COVID-19 should be seriously taken, so should patients' overall symptoms. As we move forward, it is important for us, as patients, to advocate for ourselves and ensure that our physicians provide the best care possible. And when it comes to providing the best care possible, I urge physicians to remain diligent in the face of COVID-19, but to not look for zebras just because there are hoofbeats.

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HEALTH EDUCATION MONOGRAPH SERIES

# Impact of COVID-19 Pandemic on the Social and Emotional Dimensions of Wellness of College Students

Laher Oberoi, Allie Malizia, and Jacqueline Lanier, DrPH, MCHES

Illinois State University

**Abstract**

The COVID-19 pandemic has affected lives across the globe. People were restricted socially, physically, and mentally due to the policies placed to ensure the health and safety of the public. The purpose of this study was to evaluate how the COVID-19 pandemic has affected college students' well-being with a specific focus on the social and emotional dimensions of wellness. It was found that social and emotional health were strongly impacted by the pandemic including increased anxiety, depression, and decreased connectedness with peers, instructors, family, and friends. Moreover, this study found there was a lack of resources and guidance provided by the university to help assist students' well-being during this troubling time. It is suggested that universities take necessary measures to enhance the learning and social engagement among their students by implementing new programs and policies to lessen the impacts caused by the COVID-19 and future pandemics.



## Introduction

COVID-19 has engulfed the globe affecting millions of people. As the year 2020 came to an end, the United States surpassed 20 million infections and more than 346,000 deaths; globally, death cases rose to 1,824,590 with 83,832,334 confirmed cases (Staff, 2020). Those who suffer from underlying medical problems and pre-existing conditions, such as cardiovascular disease, diabetes, chronic respiratory disease, and cancer, are at a higher risk of developing serious illness because of COVID-19 (Centers for Disease Control and Prevention [CDC], 2020). This disease has not only taken the lives of millions across the globe, but it has heavily impacted social interactions, education, physical, and emotional health and societies' health and wellness overall (Hoyt et al., 2021). Closer to home, school systems have been forced to transition from in-person learning to online/asynchronous learning, making it difficult for students to cope with day-to-day activities.

The COVID-19 pandemic is caused by a new coronavirus first identified in Wuhan, China, in December 2019 (CDC, 2020). Over the past year, scientists have learned more about this new virus. Although most people who get COVID-19 have mild symptoms, COVID-19 can also cause severe illness and even death. Some groups at an increased risk of severe illness include older adults and people who have certain underlying medical conditions (CDC, 2020). Due to this pandemic, universities were forced to transition from in-person learning to online/asynchronous learning. As a result, there have been many impacts, both positive and negative, for students enrolled in universities. The struggle to establish a healthy system has impacted students both physically and mentally causing a disruption in learning and comprehension abilities (Aristovnik et al., 2020; Hoyt et al., 2021).

The dimensions of wellness are a way to categorize a wide variety of healthy habits, as they provide a structured means for thinking about different areas of health and wellness (Stoewen, 2017). Overall wellness encompasses eight mutually interdependent dimensions: physical, intellectual, emotional, social, spiritual, vocational, financial, and environmental. The dimensions allow people to learn and assess their wellness, understand in which dimensions they are strong, and determine what dimensions need improvement. The COVID-19 pandemic had a particularly strong impact on the social and emotional well-being of many people, including college students (Hoyt et al., 2021; Charles et al., 2021). Socially, many people had experienced increased isolation and loneliness, which was accompanied by a difficulty concentrating on work and sleep pattern disruptions (Son et al., 2020). By not maintaining social lives because of limiting social interactions, higher signs and rates of depression have occurred (Son et al., 2020). It has been shown that anxiety levels in college students have risen due to factors such as living in urban areas, economic stability of themselves or family, and potentially living at home (Saladino et al., 2020). The slowdown of academic activities has shown to make college students more anxious because of the lack of in-person classes.

The purpose of this study was to evaluate how the COVID-19 pandemic has affected college students' overall well-being with a specific focus on the social and emotional dimensions of wellness. The study specifically focused on two questions: (1) How has COVID-19 impacted the social well-being of college students, and (2) How has COVID-19 impacted the emotional well-being of college students.

## Methods

This study employed a quantitative approach utilizing a survey developed through Qualtrics. The Institutional Review Board (IRB) at Illinois State University approved the study protocol. The community of focus for this study was students at a medium-sized Midwestern university (approximately 20,000 students). A survey tool was pilot tested with a convenience sample of college students prior to being sent to study participants. The survey contained 78 questions, 6 about demographics, 1 open-ended question, and the remaining 77 questions were close ended. The 78-question survey relates to the impact of the pandemic on all dimensions of wellness; questions on impact of social well-being including pandemic impact on relationships with peers, instructors, and family; change in social anxiety; and how cancelation of events impacts social well-being. There were also 15 questions on the impact of the pandemic on emotional well-being, including change in anxiety, depression, and major stressors induced from the pandemic. The survey was distributed Spring of 2021 via email to a random sample of 8,000 university students (some students opted out of emails for research). Descriptive statistics were used to analyze and summarize the data.

## Results

Of the 8,000 university students randomly selected, 476 responded to the survey, for a 6% response rate. No follow up survey was distributed. Not all questions were answered by all the respondents. As depicted in Table 1, the sample identified as predominately female ($n$ = 335, 70.4%). When asked to what extent the COVID-19 pandemic has impacted their overall well-being, there were 472 respondents to this question. Of the respondents, 34.8% ($n$ = 164) noted a very negative impact, 53.0% ($n$ = 250) slightly negative impact, 6.1% ($n$ = 29) no impact, and 6.1% ($n$ = 29) slightly or very positive impact (see Figure 1). Participants were asked to report which of the eight wellness dimensions (more than one response allowed) were mostly affected during the COVID-19 pandemic. A total of 469 participants responded to this question, resulting in emotional ($n$ = 410, 87.4%) and social ($n$ = 410, 87.4%) ranking the same with the most responses, followed by physical ($n$ = 265, 56.5%) and financial ($n$ = 250, 53.3%). Results of this question are summarized in Table 2.

### *Effects on Emotional and Social Wellbeing*

When asked to rate their overall college experience since COVID-19, specifically focusing on the emotional aspect of wellbeing from 1 to 5 (1 being excellent and 5 being poor), 43.3% ($n$ = 206) of respondents reported fair, 26.5% ($n$ = 126) reported poor, 24.2% ($n$ = 115) responded good, 3.8% ($n$ = 18) very good, and 2.3% ($n$ = 11) responded excellent.

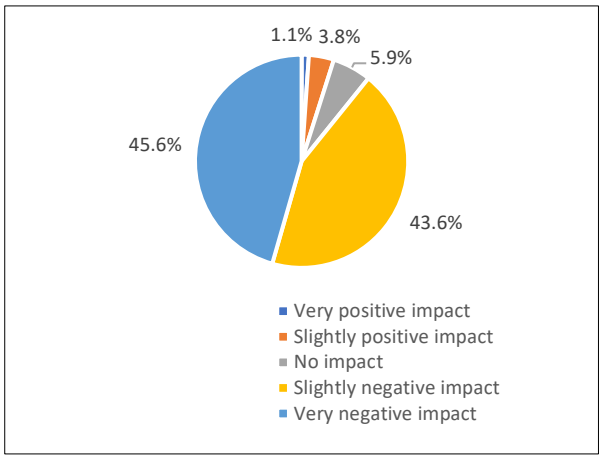
**Table 1**

*Demographics Characteristics*

| Characteristic | n<br>N = 476 | % |
|---|---|---|
| Gender identity | | |
| Female | 335 | 70.4 |
| Male | 122 | 25.6 |
| Other | 19 | 4.0 |
| Year in school | | |
| Freshman | 71 | 14.9 |
| Sophomore | 72 | 15.1 |
| Junior | 124 | 26.1 |
| Senior | 128 | 26.9 |
| Graduate school | 81 | 17.0 |

**Figure 1**

*Extent the COVID-19 Pandemic Impacted Overall Well-Being*




Of these responses, 84.2% ($n$ = 401) agreed or strongly agreed their emotional well-being has been negatively affected due to the COVID-19 pandemic (see Figure 2). About half (53.4%, $n$ = 254) of the sample responded with "Yes" to having more feelings of depression since the start of the pandemic, 18.1% ($n$ = 86) "No", 26.7% ($n$ = 127) responded with "Somewhat," and 1.8% ($n$ = 9) preferred not to answer.

When asked, if they experienced more feelings of anxiety or stress since the beginning of the COVID-19 pandemic, 75.4% ($n$ = 359) of respondents selected "Yes", 8.4% ($n$ = 40) selected "No", 15.1% ($n$ = 72) selected "Somewhat", and 1% ($n$ = 5) preferred not to answer. When asked what increased their level of stress in a select all that apply question, several issues stood out. The answer selected most (75.6%, $n$ = 360 of respondents) was "managing academic coursework" (see Table 3). Other answers selected by more than half of respondents included: "Struggling with mental health" (63.7%, $n$ = 303), "Risk of getting sick" (57.6%, $n$ = 274), "Having to quarantine or isolate" (57.4%, $n$ = 273), "Social events being cancelled" (55.0%, $n$ = 262), and "Income/financial concerns" (50.6%, $n$ = 241). Few respondents (13.9%, $n$ = 66) felt their university/college had done enough to help students with their emotional well-being during the COVID-19 pandemic. More than half respondents (58.4%, $n$ = 278) answered "Somewhat" to this question while 26.3% ($n$ = 125) responded with "No". Some suggestions provided on what their university could do to support students, reported through an open-ended question, included: More breaks, financial assistance/forgiveness, lighter workload/looser expectations of students and online learning, and additional support groups. Additionally, while most respondents (71.8%, $n$ = 342) were aware of emotional support resources, only 17.0% ($n$ = 81) reported they had sought out emotional support throughout the COVID-19 pandemic.

**Table 2**

*Dimensions of Wellness Most Affected During the COVID-19 Pandemic*

| Dimension | n<br>N = 469 | % |
|---|---|---|
| Emotional | 410 | 87.4 |
| Social | 410 | 87.4 |
| Physical | 265 | 56.5 |
| Financial | 250 | 53.3 |
| Intellectual | 206 | 43.9 |
| Environmental | 164 | 35.0 |
| Spiritual | 98 | 20.9 |
| Vocational | 80 | 17.1 |

Due to the limitations of the COVID-19 pandemic, restrictions on meetings, events, and programs had been placed on campus. Of the 476 respondents, 380 (79.8%) had an event or extracurricular activity canceled. The majority (74.4%, $n$ = 354) of respondents reported finding it difficult to join new programs and meet new people due to online learning. Along with events and social interactions being halted, COVID-19 had drastically increased students' social anxiety. Over half (52.1%, $n$ = 248) of respondents had an increased level of social anxiety when placed in a social setting, 26.7% ($n$ = 127) responded no increase, and 21.2% ($n$ = 101) responded their anxiety had somewhat increased. As seen in Figure 3, 91.2% ($n$ = 434) respondents agreed or strongly agreed to feeling less connected to their peers and instructors due to the social limitations during the pandemic.

**Figure 2**

*Emotional Well-Being was Negatively Affected by the COVID-19 Pandemic*

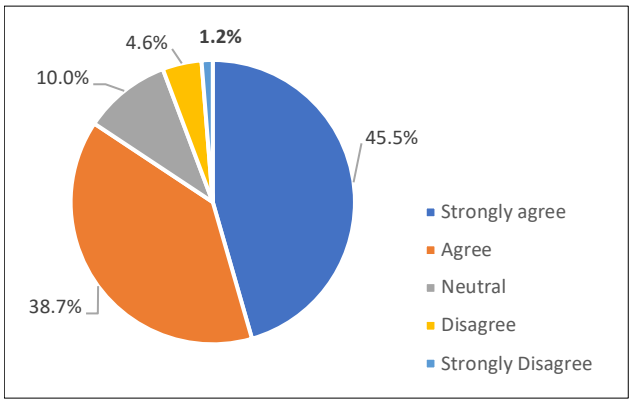


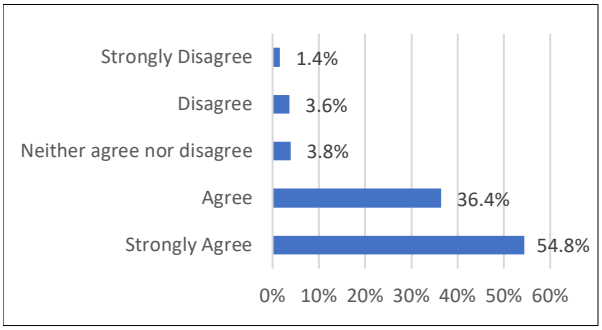
**Table 3**

*Dimensions of Wellness Most Affected During the COVID-19 Pandemic*

| Stressor | n<br>N = 476 | % |
|---|---|---|
| Managing academic coursework | 360 | 75.6 |
| Struggling with mental health | 303 | 63.7 |
| Risk of getting sick | 274 | 57.6 |
| Having to quarantine or isolate | 273 | 57.4 |
| Social events being cancelled | 262 | 55.0 |
| Income/financial concerns | 241 | 50.6 |
| Having to wear a mask | 118 | 24.8 |
| Losing a loved one | 105 | 22.1 |
| Other | 24 | 5.0 |

**Figure 3**

*Feel Less Connected to Peers and Instructors in Courses due to the COVID-19 Pandemic*




Approximately two-thirds (67.7%) 38.9%% of respondents agreed *(n* = 137) or strongly agreed (*n* = 68) that they felt less connected with family and friends due to the pandemic, as compared to those who neither agreed or disagreed (14.3%, *n* = 68), disagreed (12.8%, *n* = 61), or strongly disagreed (5.3%, *n* = 25).

## Discussion

With social distancing being regulated, gyms and restaurants being closed, remote instruction, and stress-relieving strategies being limited, it was challenging socially and emotionally for students during these unprecedented times. The COVID-19 pandemic has had a negative impact on college students' emotional wellness and stability. The current study revealed that college students were more stressed due to management of academic work, struggling with mental health, isolation, disease risk, cancelation of social events, and financial burdens. These findings are comparable to other studies previously cited (Aristovnik et al., 2020; Hoyt et al., 2021). The current study has shown that the social and emotional well-being of students was furthermore negatively impacted by the added stress of online learning, not enough time for self-care, and an increased amount of workload.

Specifically, the emotional well-being of students has been affected by the lack of a social outlet and interaction with family and peers in order to adhere to the social distancing guidelines that had been put in place. Due to social distancing guidelines, people are facing heavy social disruption. Canceling plans, staying home, and being away from family increased stress. Students felt less connected with peers, instructors, family, and friends due to the pandemic. Studies have shown the level of risk presented by social isolation is very similar in magnitude to that of obesity, smoking, lack of access to care, and physical inactivity (Holt-Lunstad & Smith, 2016; Pecanha et al., 2020).

While social isolation is preventative and necessary for mitigating the spread of COVID-19, it has social consequences and has created many subsequent stressors. This includes job loss, which leads to financial stress and food insecurity, both of which have disproportionately affected people of color (National Alliance for Mental Illinois, 2020). Therefore, it is essential to deal with the negative effects of COVID-19 on social wellness early on before it impacts well-being.

According to Lederer et al. (2021), college students' plans were altered due to the pandemic. This issue has had a prolonged detrimental effect on the emotional well-being and social status amongst college students. As suggested by Lederer et al. (2021), a teacher plays a critical role in a student's journey through college. The absence of this dynamic can pose a problem in a student's sense of belonging, readiness to obtain new information, and willingness to engage.

Some limitations to this study include the sample size of the survey data gathered. The number of surveys collected is not an illustrative number of the total Midwestern university population, and there was a small response rate. To improve the response rate, the survey could have been sent out several times and offered incentives such as gift cards to students for completion. Future studies could include a wider sample of college students from various institutions to further look at impacts of the COVID-19 pandemic. Additionally, future studies could look deeper at the social and emotional impacts of the pandemic on college students through interviews or focus groups, including how colleges can support students during a crisis such as this.

## Conclusion

It was found that social and emotional health were strongly impacted by the COVID-19 pandemic. These findings support previous studies looking at impacts of the COVID-19 pandemic on college students with those findings showing increases in stress, anxiety, depression, and social isolation of college students (Aristovnik et al., 2020; Hoyt et al., 2021; Charles, et al., 2021). Moreover, this study found that students perceived there was a lack of resources and guidance provided by the university to help assist students' well-being during this troubling time. It is suggested that universities take the necessary measures to enhance the remote learning, connectedness, and social engagement and to reduce anxiety among their students by implementing new programs and policies to lessen the impacts caused by the COVID-19 and future pandemics. Policymakers should support institutions of higher education with additional funding and support to improve social and emotional support services for students.

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# COVID-19 Stress, Food Security, and Fruit and Vegetable Consumption among University Students

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**Abstract**

The purpose of this study was to test a proposed model that examined how COVID-19 stress may have impacted fruit and vegetable (FV) consumption among U.S. college students. The model was tested using five separate scales (Cronbach's $\alpha > .70$) to measure the relationship between COVID-19 stress, food security, personal agency related to FV, behavioral intention to consume FV, and 7-day intake of FV. Multiple linear regression assessed how COVID-19 stress, food security, personal agency, and intention were associated with FV consumption. The model indicated a moderate correlation ($R = .597$) and explained 32.8% of the variance in FV consumption scores ($F = 12.454$, $p < .001$). However, COVID-19 stress and food security were not statistically significant predictors of FV consumption. This pilot study provided a reliable model to explore the relationship between COVID-19 stress and fruit and vegetable consumption among college students. Results showed that food security may act as a mediator between COVID-19 stress and personal agency and intention to consume fruits and vegetables. Overall, college students who experienced high COVID-19 stress may have also experienced inability to access fruit and vegetables during the pandemic, which is a cause for concern among health education professionals.

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## Introduction

Millions of U.S. households are struggling to gain food access as the rates of food insecurity have increased (Murthy, 2016; Wolfson & Leung, 2020). Data collected from the Food Security Supplement survey determined that approximately 89 million U.S. households were food secure in 2019 while 14 million households were food insecure in 2018 (Coleman-Jensen et al., 2019).

The most recent global outbreak, the COVID-19 pandemic, resulted in stay-at-home orders, loss of or delay in employment, decline in travel, and limited social gatherings, which impacted individuals' daily lives (Saladino et al., 2020). The COVID-19 pandemic impacted food insecurity status for millions of Americans, including college students (Baloch et al., 2020; Kinsey et al., 2020; Sahu, 2020). Food insecurity can negatively impact physical and mental health, as well as academic performance and graduation rates (Payne-Sturges et al., 2017). Approximately six million college students experienced barriers to obtaining their degree due to inadequate food and housing (Goldrick-Rab et al., 2020). Survey data from the Hope Center indicated that 38%-44% of students attending two- and four-year institutions were food insecure between April and May 2020 – near the beginning of the pandemic (Goldrick-Rab et al., 2020).

Increased stress and poor dietary behaviors of food insecure college students have negative health implications. Specifically, fruits and vegetables, which provide significant nutritional benefits, are often under-consumed among food insecure populations (Hanson & Connor, 2014; Mook et al., 2016; Sealey-Potts & Labyak, 2020; Turnbull et al.,

2021). Fresh produce is among the first food to be reduced during periods of food insecurity, while programs that improve food security [i.e., lack of access to enough foods to meet nutritional needs (Blumberg et al., 1999)], often lead to an increase in fruit and vegetable intake (Atoloye et al., 2021; Parks et al., 2021; Vericker et al., 2021). Prior to the COVID-19 pandemic, college students reported barriers to fruit and vegetable consumption, which included high costs, limited availability, and reduced access (Centers for Disease Control & Prevention [CDC], 2017; Sogari et al., 2018). Investigating the impact of the COVID-19 pandemic-related stress on food security and dietary behavior, specifically fruit and vegetable consumption, in this high-risk population can provide meaningful insight and can inform behavioral and/or policy interventions mitigating these risk factors. The purpose of this study was to explore the relationship between COVID-19 stress, food security, and fruit and vegetable consumption among college students.

## Method

### *Theoretical Framework*

The Integrated Behavioral Model (IBM) has been shown effective for examining influences of dietary behaviors, specifically fruit and vegetable consumption (Branscum & Lora, 2017; Pember, 2017; Senkowski et al., 2017). The proposed theoretical framework for this study hypothesized a relationship between COVID-19 stress, personal agency [i.e., the sense that one causes or generates their own actions (Glanz et al., 2015)], food security behavioral intention to consume fruits and vegetables, and 7-day intake of fruits and vegetables among college students. The proposed model was utilized to determine the associations between pandemic stress, food security, and constructs related to dietary behaviors among college students (see Figure 1).

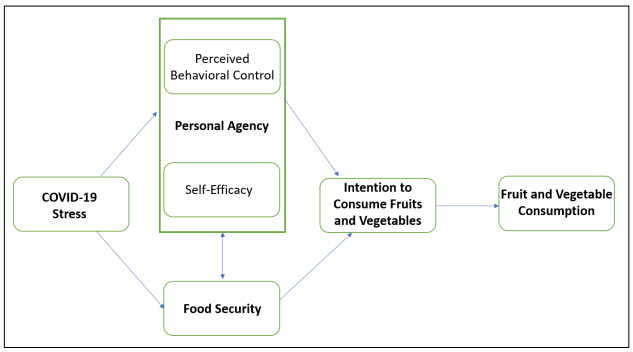
The proposed framework hypothesizes direct associations between COVID-19 stress and personal agency as well as COVID-19 stress and food security. Personal agency and food security present a bi-directional relationship with each influencing the other. Personal agency and food security are both indirect influences on 7-day fruit and vegetable consumption. Behavioral intention to consume fruits and vegetables is a direct influence on 7-day fruit and vegetable consumption. The scales that follow reflect the IBM framework.

### *Instrument Development*

At the time of this study, no existing instrument to measure the proposed model existed, although there was significant literature exploring fruit and vegetable consumption and intention, as well as food security. COVID-19 research literature, while limited, has been available since early 2020. To investigate the proposed model, the researchers developed a survey instrument following standard survey development protocol used in prior social science research (Day et al., 2013; Mueller, 1986). The protocol included the following stages: a review of relevant literature, a review of existing questionnaires related to each variable in the proposed model, the selection of appropriate survey scales, the revision of questions to fit the target group and target behavior, and the administration of the survey for the pilot test.

**Figure 1**

*Proposed Model to Explain Relationships between COVID-19 Stress, Food Security, and Fruit and Vegetable Consumption among College Students*




After a review of literature and existing surveys, scales representing each of the five proposed model constructs were selected. To measure COVID-19 stress, data were collected using the Coronavirus Stress Measure (Arslan et al., 2020). To measure personal agency, survey items were taken from the Food Attitudes and Behavior Survey (Emanual et al., 2012; Erinosho et al., 2015; National Cancer Institute [NCI], 2013). To measure food security, the 6-item Short Form Food Security Scale was used (Blumberg et al., 1999). Intention to consume fruit and vegetables was determined using the Fruit and Vegetable Intention Scale (Carfora et al., 2015). Fruit and vegetable consumption was measured based on items drawn from the Family Life, Activity, Sun, Health, and Eating (FLASHE) Survey (NCI, 2017; Nebeling et al. 2017). Additionally, 11 questions were added to collect data on basic demographic items, yielding a 36-item instrument.

### *Measures*

Demographics questions assessed participant age, sex, race, ethnicity, academic classification, current living arrangement, grade point average range, height, weight, monthly income range, and international student status. To test the proposed model in Figure 1, five unique measures were taken from the survey instruments. Each measure was determined via the specific scale described in Table 1.

**Table 1**

*Survey Scales Used to Measure the Five Constructs of Proposed Model*

| Source and Prior Usage | Revisions | Scale Scoring |
|---|---|---|
| Coronavirus Stress Scale: 5-item scale developed in 2020 to measure psychological stress related to COVID-19. Tested on young adults yielding Cronbach's alpha of .83 (Arslan et al., 2020). | None. | Responses were recorded on a 5-point, ordinal scale ranging from "1=never" to "5=very often". Items summed (range of 5 – 25) with lower scores indicating low COVID-19 stress and higher scores indicating high COVID-19 stress. |
| Food Security Scale: 6-item scale developed in 1999 based on the original 18-item scale developed in 1995 by the National Center for Health Statistics. Scale high specificity and sensitivity to food security measurement (Blumberg et al., 1999). Short form scale has been used to measure food security (USDA, 2012). | Wording on survey items was revised from "*in the last 12 months"* to *"since the start of the COVID-19 pandemic"*. | Responses to two items were coded as "1=never true", "2=sometimes true", "3=often true". Responses to three items were dichotomously coded as "1=yes", "2=no". Reponses to one item were coded as "1=almost every month", "2=some months, but not every month", "3=only 1 or 2 months". Items summed (range 6 – 15) with lower scores indicating low food security and higher scores indicating high food security. |
| Personal Agency Scale: 7-item scale measuring self-efficacy and perceived behavioral control related to fruit and vegetable intake first used in the 2007 National Cancer Institute (NCI) Food Attitudes and Behavior Survey (Erinosho et al., 2015; NCI, 2013). Scale has shown high internal consistency with a Cronbach's alpha of .92 (Emanual et al., 2012). | Original wording was "*Assuming that you want to, how confident are you that you could do each of the following starting this week and continuing for at least 1 month?"* The phrase *"for at least 1 month"* was revised to *"through the remainder of the pandemic"*. | Responses were recorded on a 5-point, ordinal scale ranging from "1=not confident at all" to "5=very confident". Items summed (range 7 – 35) with lower scores indicating low personal agency and higher scores indicating high personal agency to consume fruits and vegetables. |
| Fruit & Vegetables Intention Scale: 3-item scale developed in 2015 to measure behavioral intentions related to dietary intake. Scale indicated high internal consistency with a Cronbach's alpha of .79 (Carfora et al., 2015). | None. | Responses were recorded on a 7-point, ordinal scale ranging from "1=definitely do not" to "7=definitely do." Items summed (range 3 – 21) with lower scores indicating low intention to eat fruits and vegetables and higher scores indicating high intention. |
| 7-Day Fruit & Vegetables Consumption Scale: 4-item scale from the NCI's 2014 FLASHE Survey (Nebeling et al., 2017). Items asked about consumption of 100% pure fruit juice, fruit, green salad, and non-fried vegetables (NCI, 2017). | None. | Responses were recorded on a 6-point, ordinal scale ranging from "1=Did not consume in past 7 days" to "6=3 or more times per day". Items summed (range 4 – 24) with lower scores indicating low fruit and vegetable consumption and higher scores indicating high fruit and vegetable consumption. |

### *Pilot Testing Procedures*

This study received IRB approval Texas State University in October 2020. A pilot test was conducted to analyze the validity and reliability of the scales within the developed instrument. In October-November 2020, an email invitation was sent to students enrolled in multiple courses at one southern, U.S. university. Instructors of the selected courses provided approval and a course email list prior to sending the invitation. A total sample of 101 undergraduate and graduate students agreed to participate in the pilot test. Pilot test participants were sent an email that explained the study and provided the IRB-approved consent form. Participants were asked to complete the online Qualtrics survey and provide feedback to the researcher on the ease of procedures, survey readability, and any other pertinent information related to the instrument. Data generated from the pilot test were used to revise the survey instrument for reliability and validity.

## Results

Cronbach's alpha reliability analyses were conducted to determine data reliability for each scale on the survey. The initial Cronbach's alpha scores for data collected using the Coronavirus Stress Scale, Personal Agency Scale, and Intention Scale indicated acceptable internal consistency (Cronbach's $\alpha > .70$); however, the reliability scores for data collected using the Food Security Scale (.525) and Past 7-Day Fruit and Vegetable Consumption Scale (.659) were < .70. Revisions were made to each of these two scales to improve internal consistency scores.

The Food Security Scale included one skip-logic question that was only answered by 30.6% ($n$ = 31) of the sample. One question in the scale asked, "*Since the start of the COVID-19 pandemic, did you ever cut the size of your meals or skip meals because there wasn't enough money for food?*," and was followed by the question "*If you answered yes to the previous question, how often did this happen?"* Removal of this follow-up question increased the scale reliability score to .778 and altered the scale score range to 5-12. The initial alpha score for the Past 7-Day Fruit and Vegetable Consumption Scale was .659 but removing the question *"During the past 7 days, how many times did you drink 100% pure fruit juice like orange, apple, grape, etc.?"* increased the reliability score to .766 and altered the scale score range to 3-18. It is possible this question did not align with the other three consumption questions because it asked about beverage consumption compared to consumption of whole fruits and vegetables.

Removal of the two items yielded a highly reliable final survey instrument of 34 items. Additionally, as part of the pilot study, participants were asked to provide written feedback on any parts of the survey that may have been difficult to understand or complete; however, very few comments were provided. Three participants expressed minor confusion on the Intention Scale items which asked if they "plan to," "intend to," and "want to" eat fruits and vegetables. Because these comments were only mentioned by < 3% of the pilot sample and the scale maintained high internal consistency (.824), no changes were made to the scale. Table 2 provides the pilot test score means, standard deviations, alpha scores, and revised scale ranges.

### *Demographics Differences among Scale Scores*

Demographics (gender, ethnicity, race, living arrangement and monthly income) were examined among participants as this related to the five survey scale variables (see Table 3). Among the 101-pilot sample, there were no significant differences by gender among the five scales. Regarding ethnicity, one-way ANOVA indicated Hispanic/Latinx students reported higher levels of COVID-19 stress ($F$ = 5.350; $p$ = .023) while white students reported higher intentions to consume fruits and vegetables ($F$ = 2.614; $p$ = .030) compared to other races. Regarding living arrangement, students living with parents/guardians were more food secure ($F$ = 3.946; $p$ = .022) than their peers who lived on-campus or who lived off-campus without parents/guardians. Monthly income was explored as it related to the federal poverty level; however, there were no significant differences by income in any of the five scales.

### *Correlation and Regression Analyses*

The results of correlation analyses (see Table 4) indicated that personal agency ($r$ = .49, $p \leq .001$) and fruit and vege-

**Table 2**

*Score Range, Mean, Standard Deviation, and Cronbach's Alpha for Survey Scales*

| Scale | Mean ± SD | Cronbach's Alpha |
|---|---|---|
| COVID-19 stress | 17.59 ± 4.09 | .854 |
| Food security | 10.03 ± 2.17 | .778 (1 item removed) |
| Personal agency | 15.20 ± 5.22 | .900 |
| Fruit and vegetable (F/V) intention | 14.33 ± 3.58 | .824 |
| Past 7-day F/V consumption | 9.37 ± 3.99 | .766 (1 item removed) |

**Table 3**

*Demographic of Participants*

| Demographic | n* | % |
|---|---|---|
| Gender | | |
| Male | 23 | 22.8 |
| Female | 76 | 75.2 |
| Other | 2 | 2.0 |
| Race | | |
| White | 60 | 61.2 |
| Black or African American | 18 | 18.4 |
| American Indian or Alaska Native | 2 | 2.0 |
| Asian | 5 | 5.1 |
| Native Hawaiian or Pacific Islander | 1 | 1.0 |
| Some other race or more than one race | 12 | 12.2 |
| Ethnicity | | |
| Hispanic/Latinx/Spanish | 40 | 40.0 |
| Not Hispanic/Latinx/Spanish | 60 | 60.0 |
| Current living arrangement | | |
| Live on campus | 3 | 3.0 |
| Live off campus with parents/guardians | 24 | 23.8 |
| Live off campus, not with parents/guardians | 74 | 73.3 |
| Average monthly income level | | |
| At or below the poverty line | 22 | 22.0 |
| Up to 150% above the poverty line | 51 | 51.0 |
| 150-185% above the poverty line | 17 | 17.0 |
| > 185% above the poverty line | 10 | 10.0 |

*Category *n* differences are due to missing data from some participants

table intention ($r = .51$, $p \leq .001$) were positively associated with 7-day fruit and vegetable consumption. Personal agency was positively associated with food security ($r = .31$, $p = .002$) and intention to consume fruit and vegetables ($r = .44$, $p \leq .001$). Food security was negatively associated with COVID-19 stress ($r = -.40$, $p \leq .001$) and positively associated with fruit and vegetable intention ($r = .20$, $p = .048$). While food security was positively associated with 7-day fruit and vegetable consumption ($r = .19$, $p = .058$), this relationship was not statistically significant. COVID-19 stress was negatively associated with 7-day fruit and vegetable consumption ($r = -.12$, $p = .221$), but was also not statistically significant.

The Pearson's bivariate correlations were all in the low to moderate range with none approaching the .80 level expected for a strong relationship, implying that no multicollinearity existed in the proposed model. In addition to the Pearson's bivariate correlation analyses, the variance inflation factor was used to assess collinearity. The variance inflation factor values ranged from 1.19 to 1.31 confirming that multicollinearity did not exist in these data.

**Table 4**

*Pearson Correlations of Survey Scales to Past 7-Day Fruit and Vegetable Consumption*

| Variable | 1. | 2. | 3. | 4. | 5. |
|---|---|---|---|---|---|
| 1. COVID-19 stress | 1 | | | | |
| 2. Food security | -.402* | 1 | | | |
| 3. Personal agency | -.169 | .312* | 1 | | |
| 4. Fruit and vegetable intention | -.188 | .203* | .438* | 1 | |
| 5. Past 7-day fruit and vegetable consumption | -.123 | .190 | .489* | .505* | 1 |

*$p \leq .05$

Multiple linear regression assessed how COVID-19 stress, food security, personal agency, and intention were associated with fruit and vegetable consumption. The model indicated a moderate correlation ($R = .597$) and explained 32.8% of the variance in fruit and vegetable consumption scores ($F = 12.454$, $p < .001$). Predictor variables related to fruit and vegetable consumption included personal agency ($\beta = .349$, $p < .001$) and intention ($\beta = .301$, $p < .001$). COVID-19 stress and food security were not statistically significant predictors of fruit and vegetable consumption.

## Discussion

This pilot study yielded two important public health outcomes. First, the study indicated that the instrument could produce valid and reliable data. This instrument can be used to explore the relationships between COVID-19 stress, food security, personal agency, behavioral intention, and 7-day consumption of fruit and vegetables among college students. Second, this study generated pilot data, which helps to explore the relationship of COVID-19 stress and its impact on student dietary behaviors, particularly consumption of fruits and vegetables. College students are an underrepresented population who have been impacted by the financial, mental, and physical stressors of the COVID-19 pandemic (Jones et al., 2021; Son et al., 2020; Wilson et al., 2021);

therefore, research is needed to explore the impact of COVID on college populations.

This study found that higher COVID-19 stress scores correlated to lower food security scores among college students in the current sample. Research early in the pandemic indicated that food insecurity doubled among households with no children and tripled among households with children (Schanzenbach & Pitts, 2020). The present study provides initial evidence that college students who experienced high COVID-19 stress may also have experienced inability to access food during the pandemic. While food security did not directly relate to 7-day fruit and vegetable consumption in this study, this important measure was related to fruit and vegetable intention and personal agency. The construct of personal agency applied to dietary behaviors allows for a determination of two dimensions: (1) the internal belief that self-discipline influences dietary behaviors, and (2) the confidence in one's self-discipline to eat healthy (Baker et al., 2003). As this study indicated, food security among college students may act as a mediator between COVID-19 stress and personal agency and intention to consume fruits and vegetables. Both behavioral intention to consume and personal agency of fruit and vegetable consumption were moderate predictors of fruit and vegetable consumption among participating college students.

A limitation of this pilot study included its small, homogenous sample, which restricts generalizability. Larger, more diverse samples may yield information more applicable to various populations; however, this sample was considered sufficiently large enough for a questionnaire-based pilot test as research indicates a sample of at least 30 is needed, while samples of at least 100 are preferred to assess survey fit (Chen et al., 2014; Perneger et al., 2015). The instrument used in this pilot study produced reliable and valid data and could be used to expand research into other populations which may experience differing rates of stress and food security.

Future studies should seek to utilize this new instrument to explore the relationship of pandemic-related stress and fruit and vegetable consumption. Additional research should focus on behavioral intention for improving fruit and vegetable consumption among college students because understanding the influences of fruit and vegetable consumption can further inform dietary behavior interventions. While prior studies indicated periods of high stress and food insecurity may impact the ability to consume fruits and vegetables (Coleman-Jensen et al., 2019; Sogari et al., 2018), these variables did not appear to directly impact fruit and vegetable consumption among this sample of college students. However, future research could continue to explore how COVID-19 stress may impact dietary behaviors through the mediating variables of food security, personal agency, and intention. Further exploring this relationship may allow health education professionals to develop more appropriate strategies to address dietary behavior.

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HEALTH EDUCATION MONOGRAPH SERIES

# Review of Michigan Public University COVID-19 Response Plan Websites

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## Abstract

This study examines how 15 public universities in Michigan formatted their COVID-19 response plan websites. The study focused on information from each university's COVID-19 data dashboard, self-assessment process, testing, policies, and overall preparedness and response plan. Website data collection occurred during the Fall 2020 semester, approximately August to December 2020. All universities had a response plan and almost all included a dashboard on their sites with the majority sharing completed testing and percent positivity data. A large majority of universities also included a self-assessment on their site, although types of questions varied. Through review of the strengths and weaknesses of how each university handled COVID-19, certain elements should be added to a university's response plan as preparation for adapting to a future pandemic.

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## Introduction

As of December 2020, there were approximately 18 million COVID-19 cases and about 315,300 deaths in the U.S. due to COVID-19 (John Hopkins University, 2020). COVID-19 is a novel virus that had not previously been seen in humans. The disease can lead people to have very mild symptoms to severe illness or even death (Centers for Disease Control and Prevention, 2021).

COVID-19 caused many places, including universities, to be shut down or adapt to an online environment (Western Michigan University, 2021). As an example, universities in Michigan adapted their campuses and courses for online delivery, without much time to prepare. Every university handled the pandemic differently when determining how to adapt their campus, and each had strengths and weaknesses to their COVID-19 response plan. Those strengths and weaknesses from each COVID-19 response plan were compiled to recommend certain elements that should be included if a pandemic were to occur in the future. Universities in Michigan were not alone in moving to an online environment, as the same was happening throughout the United States. For example, in March 2020, Pennsylvania Governor Tom Wolf prohibited the operation of businesses that are not life sustaining (Wolf, 2020). Another example, in March 2020, Ohio State University suspended in-person classes for the rest of their spring semester (Milnes et al., 2020). Almost every state in the United States was following similar practices relating to businesses and schools.

## Methods

A review of the 15 public universities in Michigan led to an analysis of their COVID-19 response plans. The universities examined included: Central Michigan University (CMU), Eastern Michigan University (EMU), Ferris State University (FSU), Grand Valley State University (GVSU), Lake Superior State University (LSSU), Michigan State

University (MSU), Michigan Technological University (MTU), Northern Michigan University (NMU), Oakland University (OU), Saginaw Valley State University (SVSU), University of Michigan-Ann Arbor (UM-AA), University of Michigan-Dearborn (UM-D), University of Michigan-Flint (UM-F), Wayne State University (WSU) and Western Michigan University (WMU).[1] Each of these universities vary in size of enrollment of students and faculty. MSU has the largest enrollment with approximately 50,000 students and 5,700 faculty members, while UM-F has the smallest enrollment with approximately 7,000 students and 600 academic staff.

The goal of this project was to identify the nature of the collective Michigan university COVID-19 response as a means for proposing what should be included in a university response plan should another pandemic occur in the future. In order to analyze each university's COVID-19 response plan, different aspects of the plan were examined. Information from each university's data dashboard, self-assessment process, COVID-19 testing, COVID-19 policies, and overall COVID-19 preparedness and response plan were examined via their websites. The timeline for data collection was the Fall 2020 semester, approximately August to December 2020. Data were collected by researching each university's response plan website. Both qualitative and quantitative data were used for their project. Key elements were examined, including data dashboards, self-assessments, COVID-19 testing, and policies. Once each of these elements was pulled from the respective university's website, they were compared among each other. Data were analyzed using a variety of methods, such as frequency in order to show how many universities followed similar procedures and processes. Each university was compared to the other universities in Michigan to look for similarities and differences.

## Results

### *Data Dashboard*

The COVID-19 data dashboard was how each university shared the prevalence of COVID-19 on their respective campuses. Universities chose to organize their dashboard in their own way. Some universities displayed very similar looking dashboards, while others were drastically different. The number of items on the dashboard varied from not having a COVID-19 dashboard to having 10 different items showcased. Table 1 shows some of the elements that the universities chose to display on their data dashboard, and how many of the universities displayed that item.

**Table 1**

*COVID-19 Data Dashboard*

| Dashboard Items | Number of Universities Displaying Item | Universities |
|---|---|---|
| Incidence of COVID-19 cases | 14 | CMU, EMU, FSU, GVSU, LSSU, MSU, MTU, NMU, OU, SVSU, UM-AA, UM-D, WSU, WMU |
| University role | 9 | EMU, GVSU, LSSU, NMU, OU, SVSU, UM-AA, UM-D, WSU |
| Number of completed COVID-19 tests | 12 | CMU, EMU, GVSU, LSSU, MSU, MTU, NMU, OU, UM-AA, UM-D, WSU, WMU |
| Percent positivity | 11 | CMU, EMU, GVSU, LSSU, MSU, MTU, NMU, OU, UM-AA, WSU, WMU |

The most common way Michigan universities organized their dashboards was by showcasing four different types of data and in relation to their role at the university (student, faculty, or staff). All the universities with a dashboard showed data relating to how many active cases of COVID there were, and 12 universities showed how many COVID-19 tests were completed. Nine of the universities (60%) chose to list data by the university role of the person who was infected or being tested. For example, GVSU displayed data by faculty/staff, on-campus students, and off-campus students. Other universities, such as UM-AA, listed their

[1] https://www.cmich.edu/covid19/Pages/default.aspx
https://www.emich.edu/coronavirus/index.php
https://www.ferris.edu/HTMLS/news/coronavirus/homepage.htm
https://www.gvsu.edu/lakerstogether/ https://www.lssu.edu/coronavirus/
https://msu.edu/together-we-will/
https://www.mtu.edu/flex/
https://nmu.edu/safe-on-campus/
https://oakland.edu/return-to-campus/
https://www.svsu.edu/nestplan/
https://campusblueprint.umich.edu/
https://umdearborn.edu/offices/external-relations/key-issues/um-dearborn-covid-19-response
https://www.umflint.edu/covid-19/
https://wayne.edu/coronavirus
https://wmich.edu/covid-19

data only by student or non-student, while still other universities, such as WMU, did not report any data by role.

Some of the universities chose to either add extra information to their dashboards or were lacking key elements that the dashboard should have included. For example, UM-AA showed which residence halls on their campus had confirmed COVID-19 cases and how many cases were present. This was helpful because individuals looking at the dashboard could see which residence halls had the most COVID-19 cases, which may lead to addressing those issues. Another interesting aspect a university included on their data dashboard was showing the utilized capacity of their quarantine/isolation housing. Both UM-AA and GVSU took this approach with their dashboards. Two university dashboards, SVSU and FSU, did not show the number of individuals being tested. This resulted in not being able to calculate a percent positivity relating to positive COVID-19 cases.

### *COVID-19 Self-Assessment*

Almost all (13) of the universities required individuals to fill out a COVID-19 self-assessment before coming to campus. All assessments that were used asked about having symptoms related to COVID-19 and if the individuals came in close contact with someone else who had a positive COVID-19 result. Other than that, each university took a slightly different approach to how many, and the types of questions asked. Table 2 shows examples of the types of questions in a self-assessment, and how many universities included that item in their assessment.

**Table 2**

*COVID-19 Self-Assessment*

| Self-Assessment Items | Number of Universities | Universities |
|---|---|---|
| Symptoms | 13 | CMU, EMU, FSU, GVSU, MSU, MTU, OU, SVSU, UM-AA, UM-D, UM-F, WSU, WMU |
| Close contact information | 13 | CMU, EMU, FSU, GVSU, MSU, MTU, OU, SVSU, UM-AA, UM-D, UM-F, WSU, WMU |
| Received COVID-19 test | 6 | FSU, GVSU, MTU, OU, WSU, WMU |
| Questions about recent travel | 3 | EMU, GVSU, WSU |

The number of questions asked on the self-assessment varied from not having a self-assessment to asking 16 different questions. The most common number of questions asked was three, utilized by four universities (UM-AA, UM-D, UM-F, and MTU). The most common questions asked on the self-assessment focused on specific COVID-19 symptoms, being in close contact, and recently having a positive COVID-19 test. OU asked 16 different questions. Their questions varied from asking about specific symptoms, close contact information, and other various questions all the way to accepting a COVID-19 honor pledge, where the user committed to wearing a face covering, practicing good hygiene, and adhering to safe physical distancing. This honor pledge had to be completed every time the self-assessment was taken. Another interesting finding of the self-assessment is that two universities did not utilize one. A self-assessment for LSSU could not be found on the website, and NMU individuals did not have to fill one out unless an employer required it. All other universities required the self-assessment to be completed to be on campus.

### *COVID-19 Testing*

Proper COVID-19 testing was important for universities to gauge the prevalence of COVID-19 on their campuses. Some universities conducted testing through their campus health centers, while others relied on testing data from local health departments. All except two universities (UM-D and UM-F) had a COVID-19 testing procedure, whether it was conducted on or off campus.

Regarding costs for COVID-19 tests, 13 universities (86.7%) did not charge individuals for a COVID-19 test if they were experiencing COVID-19 symptoms. In comparison, 10 universities (66.7%) also did not charge individuals for COVID-19 tests for those who did not have symptoms.

Many of the universities used similar COVID-19 tests with nasal-swabs being the most popular. Other forms of COVID-19 tests were saliva samples or back-of-the-throat swab testing. Three universities (20%), UM-AA, LSSU, and GVSU, participated in a random testing COVID-19 surveillance program. Individuals in the campus community would get randomly selected to be tested for COVID-19, regardless of displaying symptoms or not. The purpose of the surveillance program was to identify the prevalence of COVID-19 in the campus community because many people who may have been asymptomatic did not show symptoms for COVID-19.

### *COVID-19 Preparedness and Response Plan*

Every university had developed a response plan to the ongoing pandemic. Some university plans contained more detail, and many of the universities used similar guiding principles. Some key principles for the universities would ensure the health and safety of campus and encourage

members of the campus community to practice social distancing, to wear a mask, and to maintain good hygiene; all which had been shown to lessen the spread of COVID-19. Nine of the universities (60%) also chose to develop names for their response plans. For example, GVSU titled their plan "Lakers Together." This inferred that the campus community was working together and trying to stay connected. WMU named their plan "Be Safe, Be Smart, Be Broncos." This plan implied that WMU was prioritizing safety for their community and emphasizing how important it is to make smart choices.

Many universities adopted interesting approaches to developing their preparedness and response plan. For example, all three of the UM schools required the campus community to complete a mandatory training. This helped the campus community become aware of COVID-19, and what was expected of them. Some universities (e.g., MSU) required students living on campus or coming to campus or any other university-controlled property to receive their influenza vaccine for the Spring 2021 semester (Michigan State University Office of the President, 2020). By doing this, they were hoping to decrease other sicknesses prevalent on campus. MSU was also a pioneer in research that used a wastewater monitoring process on campus as another way to track COVID-19 numbers (Thompson, 2020), which was also later implemented by other universities. The goal was to identify the prevalence of the COVID-19 virus within the campus, especially if individuals were not getting tested due to being asymptomatic. OU had members of the campus community wear a "BioButton," which tracked skin temperature, respiratory rate, and resting heart rate. The results were then compared to the answers from the daily screening questions as a means for helping to identify individuals who may have COVID-19.

## Discussion

There are strengths and weaknesses within each university's COVID-19 response approach. Findings show how important it is to have a cohesive response plan when dealing with a pandemic. Having a data dashboard is important because it shows how prevalent COVID-19 is within the campus community. A data dashboard that helpful in showing relevant information, such as number of tests completed, number of positive tests, and the role of the person being tested. This information helps the university leadership make informed decisions about their policies. A COVID-19 self-assessment is also important to include in the response plan because it helps track people who have symptoms and those who have not yet been tested. COVID-19 testing plays a role in mitigating the spread of infection. Having a centralized location where the campus community can get tested is important to help control the spread.

No one hopes an unforeseen pandemic like COVID-19 will ever happen again that causes universities to shut down on-campus activities. However, if another infectious disease pandemic were to occur, the following are recommendations for how universities could handle their response.

The data dashboard should list data by the university role (student, faculty, staff) of the person infected or being tested. This shows where the positive test results are and what type of population is being tested. It is also important that a data dashboard includes the number of individuals who received a positive test result, and the overall number of individuals who were being tested. By including both of those numbers, the percent positivity can be calculated, thus identifying the percent of those being tested who receive a positive result. Another important element to include in the data dashboard would be the number of active cases of the virus, as this informs individuals in the community of the prevalence of the virus within the campus.

It is recommended that the university develop a self-assessment for individuals to take before coming on campus. The self-assessment should include a positive test result in the last 14 days, any COVID-19 related symptoms, or if an individual was in close contact to someone else with a positive test result. These would be relevant questions and required before entering any campus-related building. This helps to determine if individuals should not be coming to campus and if they should be seeking a medical provider to get tested.

COVID-19 testing was the main way universities were able to identify how much the virus was impacting their campus communities. Universities should provide testing for free, especially if a person has symptoms. This helps ensure that individuals are getting tested and being properly treated if they do have the virus. Universities should also provide free testing, even if an individual does not have any symptoms. When conducting testing, it is helpful for universities to offer their testing on campus. Offering testing on campus helps eliminate barriers for those living on campus who have difficulties traveling to get tested. Universities should also consider engaging in a random testing surveillance program, which would help to identify individuals on campus who have a positive test result but may not have gotten tested because of a lack of symptoms. The individual can then be isolated before spreading the virus around campus.

Every university included in this review had developed a COVID-19 preparedness and response plan. It is highly recommended that universities develop a response plan so the campus communities know what to expect and can keep abreast of what is happening with regard to handling a pandemic. It is useful for the universities to include guiding principles in their plan that directly correlate to what the state and local health departments and the Centers for Disease Control and Prevention (CDC) are recommending. Many of the universities in Michigan include elements such as mask wearing and social distancing in their plans because these are what the health departments and CDC recommended. Universities should investigate developing a name

for their response plan, as that helps center the campus community on what they can expect to be the focus of the plan. One more element is to develop training that students, faculty, and staff must complete. This helps the campus community know what the university is expecting and training on how to keep themselves and their community safe. The final recommendation for state public universities to consider is coordinating their efforts, so a common and consistent approach is being implemented statewide.

The analysis conducted in this paper identified inconsistencies across universities in how they addressed and responded to the pandemic. In preparing for future pandemics, it may be beneficial for universities to work together prior to the event in order to have an agreed upon and common response approach that can be implemented at each institution.

## Conclusion

Universities in Michigan chose to handle the shutdown and reopening of their campuses due to the COVID-19 pandemic in different ways. Each university had strengths and weaknesses within their response plan. Some universities developed similar actions, such as developing a COVID-19 preparedness and response plan, but plans have some differences, such as including varying information on their data dashboards. After examining how the 15 universities handled their COVID-19 response, key elements for each plan have been recommended if a pandemic like this occurs in the future. A main recommendation that evolved from this project is that universities should coordinate efforts, as this would lead to less confusion among the campus community because the same efforts are being implemented across the state.

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HEALTH EDUCATION MONOGRAPH SERIES

# Attitudes and Perceptions of Face Coverings among College Students

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**Abstract**

College students have been drastically impacted by COVID-19 with many struggling to adjust to safety requirements. Past research revealed that increased knowledge about COVID-19 does not correlate with increased odds of wearing a face covering, which could impact college students' risk (Clements, 2020). The current research examined attitudes and perceptions of college students regarding face coverings to determine activities they perceived as higher or lower risk. This single-point cross-sectional design measured face covering habits and perceptions among 1,221 students across two institutions of higher learning. Results indicated students believe face coverings are protective, but it is unknown whether their value is in protecting themselves or others. Students reported increased confidence wearing face coverings in social settings. Information and data collected can be further analyzed to explore face covering perceptions.

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## Introduction

Daily life has changed dramatically following the discovery of a cluster of respiratory illnesses initially reported on December 31, 2019, in the Hubei province in China. This finding led Chinese authorities and health officials to conduct laboratory testing of infected individuals and eventually identify a new type of coronavirus, now known as the novel coronavirus (2019-nCoV) (World Health Organization, 2020). Since then, the virus has gained global attention after spreading worldwide and achieving pandemic status (Cucinotta & Vanelli, 2020).

COVID-19 has forced individuals to adapt their daily lives in many ways. One of these adaptations is wearing a face covering in public settings to mitigate the spread of the coronavirus (Centers for Disease Control and Prevention, 2020). A face covering was originally recommended due to the surge of patients amid the pandemic that led to a shortage of medical equipment, including masks (Brooks et al., 2020). Besides the shortage of medical masking supplies, experts also began recommending cloth face coverings to slow community spread of the virus. In a study from Qingdao Agricultural University where researchers sought to evaluate the efficiency of alternative face coverings, they discovered face coverings can block approximately 95% of the virus (Ma et al., 2020). A more recent randomized control trial, conducted across 600 villages in Bangladesh, found that a 30% increase in mask-wearing led to a 10% drop in COVID-19 cases (Chow, 2021). The study also determined that face coverings significantly reduced symptomatic cases among older adults, and surgical masks were

more effective than cloth masks. These findings demonstrate promising results for other face covering campaigns.

To mitigate the spread of COVID-19, an increasing number of Americans have been adopting the use of face coverings (Clements, 2020). Following the initial outbreak of COVID-19 in the United States, there has been an effort from public health officials to share the necessary information regarding the virus and documented preventative measures. Brooks and colleagues (2020) published an editorial regarding the latest science of face coverings, where they concluded that face coverings, when used universally within communities, are a critical mechanism for preventing the spread of COVID-19. However, not everyone has been willing to wear face coverings, which diminishes their overall effectiveness (Young & Blondin, 2020).

One population of particular interest in the discussion of why individuals choose whether to wear face masks are young adults, specifically those in college due to their social habits and cultural patterns. Even after social distancing recommendations were introduced, students continued to stand in line for bars and gather on public beaches as the virus continued to spread (Young & Blondin, 2020). Clements (2020) found that for every point increase in knowledge scores (meaning how much an individual knows about COVID-19), the odds of wearing a mask outside the home decreased by 44%. To some degree, this seems in opposition to the expectation that increased knowledge about COVID-19 should lend itself to the wider adoption of face coverings (Clements, 2020). These findings suggest a call for further investigation, especially among the college-aged population.

The purpose of this study was to explore college students' attitudes and perceptions concerning face coverings and identify activities they viewed as higher or lower risk. The results can be utilized to inform university campaigns and other guidelines for COVID-19 prevention.

## Methods

### *Sample*

A single point cross-sectional design was used to measure student face covering habits and perceptions to answer the research question, "What activities do college students perceive as higher or lower risk in regard to COVID-19, and to what extent does that inform their choice to wear face-coverings when near others?" Students from Central Michigan University (CMU) and State University of New York College at Cortland (SUNY Cortland) were surveyed. CMU is a mid-sized public university located in a micropolitan area in Michigan with approximately 13,000 students. SUNY Cortland is also a small-sized public university with about 7,000 students and is located in a micropolitan area in New York. Upon approval from the institutional review board at SUNY Cortland, an original email was sent to 20,518 students enrolled at each of two universities using Qualtrics®, an internet-based survey platform. Four follow-up emails were sent to non-respondents. Informed consent was gathered electronically before participants began the survey. All responses were anonymous.

### *Measures*

Survey design included questions assessing basic demographics (age, race, gender identity, class standing, political affiliation, health-related major standing, mode of class instruction, and ESG standing), and perceptions and behaviors around face coverings. The Health Belief Model (Champion & Skinner, 2008) and its key constructs were used to design survey questions. The survey was assessed for validity by three health education specialists.

Face covering use and care were assessed via several questions. Use was determined by asking participants what type of face coverings they wear and how likely they are to wear them in different social settings. Face mask cleanliness was measured by asking how often participants washed and where they stored their face coverings. Survey questions measuring the Health Belief Model constructs utilized Likert-type scales. The constructs incorporated into the survey included the perceived benefits and effectiveness of wearing a face covering to protect oneself and others from COVID-19. Additionally, the susceptibility of contracting COVID-19 in various settings and the severity of COVID-19 for oneself and the general population were determined. Finally, self-efficacy was assessed by inquiring how confident participants were about their ability to correctly wear, access, and select a face covering. Assessment of self-efficacy included additional queries about how well participants remembered to wear a face covering overall and in social settings.

### *Data Analysis*

Data were cleaned by eliminating incomplete and duplicate surveys. Surveys that were less than 90.0% complete were also excluded from the final sample. After data cleaning, frequency distributions were gathered for each question using IBM® SPSS®. Frequency tables were completed for the demographic information, multiple response questions, and Likert-type scale questions.

## Results

### *Demographics*

The frequency statistics of the demographics are displayed in Table 1. Out of the 20,518 students who were sent surveys, 4,568 surveys were completed, representing a 22.3% return rate. After discarding incomplete and duplicate surveys, the study achieved a sample size of 1,221 individuals enrolled at CMU that represented a large portion of the participants with 993 (81.3%), and those attending SUNY Cortland represented a smaller number at 228 (18.7%).

Juniors and seniors represented the highest groups regarding class standing with 309 (25.4%) and 326 (26.7%) respondents, respectively. The participants predominantly identified as White, 1,078 (88.7%). Regarding political affiliation, 510 (42.9%) of the participants reported being democrat, 218 (18.4%) independent, and 191 (16.1%) republican. In relation to COVID-19 diagnosis, the highest reported response was no, 964 (79.1%), followed by yes with mild symptoms, 173 (14.2%).

### *Face Covering Use, Perceived Benefits, and Perceived Barriers*

The perceived benefits, perceived barriers, and use of face coverings in respondents are displayed in Table 2. Participants were asked a multiple response question regarding the type of face covering they use. Cloth face mask with ear loops was used most, 1,046 (85.7%), followed by a disposable surgical face mask (808, 66.2%). With regard to perceived benefits and the potential protection of a face covering, 974 (80.4%) reported that wearing a face covering protects others from COVID-19, 866 (71.5%) reported that it could save lives, 189 (15.6%) reported they believed there were no benefits to wearing a face covering, 349 (28.6%) reported that face coverings were "somewhat effective" in protecting themselves from COVID-19, and 532 (43.6%) reported that face coverings were very effective in protecting others.

Concerning the perceived barriers and what makes it difficult for individuals to wear a face covering, 605 (61.1%) respondents stated it was not difficult to wear a face covering compared to 238 (24.0%) who indicated that the discomfort of a face covering made it difficult. In addition, many respondents noted the difficulty they had in wearing a face covering while wearing glasses and exercising, as well as anxiety issues, skin irritation, and health/asthmatic problems. There was also a common theme regarding issues with mask mandating and perceived restriction of personal liberty.

**Table 1**

*Demographics Characteristics and COVID-19 Status*

| Characteristics | n (%) |
|---|---|
| Institution attending | n = 1221 (%) |
| Central Michigan University | 993 (81.3) |
| SUNY Cortland | 228 (18.7) |
| Class standing | n = 1218 (%) |
| Freshman | 167 (13.7) |
| Sophomore | 224 (18.4) |
| Junior | 309 (25.4) |
| Senior | 326 (26.7) |
| Graduate Student | 192 (15.8) |
| Race/Ethnicity identification | n = 1215 (%) |
| White | 1078 (88.7) |
| Black/African American | 54 (4.4) |
| American Indian or Alaska Native | 28 (2.3) |
| Asian American | 23 (1.9) |
| Native Hawaiian or Pacific Islander | 4 (0.3) |
| Hispanic/Latino | 61 (5.0) |
| Other* | 32 (2.6) |
| Prefer not to say | 44 (3.6) |
| Gender identification | n = 1216 (%) |
| Female | 804 (66.1) |
| Male | 332 (27.3) |
| Non-binary / third gender | 36 (3.0) |
| Transgender/Transexual | 6 (0.5) |
| Other** | 12 (1.0) |
| Prefer not to say | 26 (2.1) |
| Political affiliation | n = 1188 (%) |
| Democrat | 510 (42.9) |
| Republican | 191 (16.1) |
| Independent | 218 (18.4) |
| Libertarian | 78 (6.6) |
| Green | 16 (1.3) |
| Other*** | 175 (14.7) |
| Ever diagnosed with COVID-19 | n = 1219 (%) |
| Yes, with severe symptoms | 28 (2.3) |
| Yes, with mild symptoms | 173 (14.2) |
| Yes, with no symptoms | 46 (3.8) |
| No | 964 (79.1) |
| Prefer not to say | 8 (0.6) |

*Note.* * Includes South Asian, Middle Eastern, Chaldean, and Bangladeshi. * Includes Genderfluid, Non-binary and Transgender, and Gender Queer. *** Includes prefer not to answer, no affiliation, socialist, and undecided.

### *Perceived Susceptibility*

The perceived susceptibility of COVID-19 in college-aged populations is displayed in Table 3. The survey question focused on how likely they will be exposed to COVID-19 in various settings. These settings included both indoor and outdoor activities, such as being in a classroom, sporting events, bars and clubs, and academic buildings. The highest response for classroom was "Sometimes" with 530 (43.7%). Indoor and outdoor sporting events both had the high responses to "I am never in this setting" with 492 (41.5%) and 436 (36.8%), respectively. Bars and clubs varied as 469

**Table 2**

*Face Covering Use, Perceived Benefits, and Perceived Barriers*

| Use, Perceived Benefits, and Perceived Barriers | n (%) |
|---|---|
| Face covering type | n = 1221 (%) |
| Cloth face mask with ear loops | 1046 (85.7) |
| Disposable surgical face mask | 808 (66.2) |
| N95 face mask | 139 (11.4) |
| Cloth face mask with head ties | 113 (9.3) |
| Bandana or neck gaiter | 107 (8.8) |
| Face shield WITH a face mask underneath | 59 (4.8) |
| Face shield WITHOUT a face mask underneath | 14 (1.1) |
| Scarf | 8 (0.7) |
| None of the above | 4 (0.3) |
| Face covering beliefs | n = 1212 (%) |
| Wearing a face covering protects others from COVID-19 | 974 (80.4) |
| Wearing a face covering could save lives | 866 (71.5) |
| Wearing a face covering protects you from COVID-19 | 796 (65.7) |
| Wearing a face covering makes you feel good because you are protecting others | 690 (56.9) |
| There are no benefits to wearing a face covering | 189 (15.6) |
| Face covering effectiveness in COVID-19 protection | n = 1221 (%) |
| Not effective | 223 (18.3) |
| Somewhat effective | 349 (28.6) |
| Effective | 334 (27.4) |
| Very effective | 294 (24.1) |
| Unsure | 21 (1.7) |
| Effectiveness of face covering in protecting others from COVID-19 | n = 1220 (%) |
| Not effective | 134 (11.0) |
| Somewhat effective | 236 (19.3) |
| Effective | 298 (24.4) |
| Very effective | 532 (43.6) |
| Unsure | 20 (1.6) |
| Difficulty in wearing a face covering | n = 990 (%) |
| It is not difficult to wear a face covering | 605 (61.1) |
| The discomfort of a face covering | 238 (24.0) |
| Other (open response)* | 131 (13.2) |
| Access to face coverings | 10 (1.0) |
| Knowing when to wear a face covering | 5 (0.5) |
| Knowing how to correctly wear a face covering | 1 (0.1) |

*Note.* *Includes issues with glasses fogging up, working out, skin irritation, anxiety disorder, asthma, "hard to breathe", "Violation of constitutional right", "Lack of humanization, seeing less of people's faces/emotions", "They are useless," and other similar answers.

(39.5%) reported "I am never in this setting," 264 (22.3%) reported "Sometimes", and 206 (17.4%) reported "Often". With regard to on-campus dining facilities, 458 (38.6%) reported "I am never in this setting", and 375 (31.6%) reported "Sometimes". Both small and large gatherings in academic buildings had "Sometimes" as the most reported response with 625 (52.7%) and 415 (35.1%), respectively. University library had 335 (28.3%) reporting "I am never in this setting" and 476 (40.2%) reporting "Sometimes."

The perceived likelihood for wearing a face covering is displayed in Table 4. The question asked in this section was how likely students are to wear a face covering in various settings. In a classroom setting, the highest response was "Always" with 882 (74.8%) reporting. Indoor and outdoor sporting events both had the highest following response within the question "I am never in this setting" with 528 (45.4%) and 463 (39.8%), respectively, and 249 (21.4%) reported they would never wear a face covering at an outdoor sporting event. In a bar/club setting, 585 (50.2%) reported "I am never in this setting", and 244 (20.9%) reported "Always". With regard to on-campus dining, 541 (46.5%) reported "I am never in this setting", and 375 (32.2%) reported "Always". Both small and large gatherings in academic buildings had "Always" as the most reported response with 704 (60.4%) and 605 (51.9%), respectively. University library had 636 (54.5%) "Always" and 333 (28.6%) report "I am never in this setting" responses.

### *Perceived Severity*

Perceived severity of COVID-19 in college-aged populations is displayed in Table 5. When asked how serious of an illness do they believe COVID-19 is overall, 610 respondents (50.0%) reported "very serious" with 110 individuals (9.0%) responding "not serious". In response to how serious the illness would be for the individual if contracted, 444 (36.5%) responded "not serious", 349 (28.7%) responded "somewhat serious", 201 (16.5%) responded "serious", and 176 (14.4%) responded "very serious".

### *Self-efficacy*

Behavior of and self-efficacy in wearing face coverings are displayed in Tables 6 and 7. Participants were asked how often they forget to wear their face covering with the highest response being "never", 714 (58.9%), followed by 333 (27.5%) responding "sometimes". With regard to how confident participants are in wearing a face covering, 1,122 (92.1%) responded high confidence, while 96 (7.9%) responded low confidence. Pertaining to selection of face coverings, 947 (77.8%) of respondents were highly confident in their choice, while 270 (22.2%) were less confident. Access to face coverings was high with 1,143 (94.0%) responding they have ahigh level of confidence, compared to 73 (6.0%) who responded low confidence. When asked about remembering to wear their face covering, 1,042 (85.8%) responded they were highly confident and 173 (14.2%) responded they were less confident. Regarding wearing a face covering. correctly, 1,123 (92.4%) responded high confidence and 93 (7.6%) responded low confidence. Wearing a face covering in social settings resulted in 843 (69.5%) responding high confidence and 370 (30.5%) responding low confidence.

## Discussion

The goal of this study was to examine attitudes and perceptions regarding face coverings among college students to determine what activities they perceived as higher or lower risk related to COVID-19. Additionally, researchers investigated to what extent students' beliefs informed their choices to wear face coverings when near others. Overall, the project shed some light on the perceptions of students and masking behavior.

With student perceptions of efficacy, there was a large spread in student beliefs about the effectiveness of masks. These data reveal there is not a clear consensus on the level of effectiveness of face coverings as a protective measure. These beliefs may directly impact students' actions, and the results are notable because they indicate a factor that may be a significant barrier to behavioral uptake. By educating students and sharing data supporting the success of face coverings, these feelings of distrust and uncertainty may be reduced, and preventive action may be increased.

When looking at face covering self-efficacy, the data reveal that students are highly confident in their ability to remember, wear, and access face coverings. In Table 7, they also indicated, with high confidence, their ability to wear face coverings in social settings. This is supported by the data in Tables 3 and 4 where it is revealed that students are more likely to wear face coverings in social settings where they indicated feeling more susceptible to COVID-19, such as classrooms and indoor social settings. Further analysis might investigate whether students feel more at risk in campus settings or off-campus. This information is relevant as it indicates that universities should continue to provide clear face covering guidelines so that students can continue to feel confident in their ability to wear them.

Though the results reflect that many students do not perceive COVID-19 as a serious illness for themselves, additional research is necessary to determine whether students' beliefs regarding face coverings heavily favor interpersonal benefits over intrapersonal benefits. This information is vital

**Table 3**

*Perceived Susceptibility of Contracting COVID-19 by Setting*

| Setting | N | Perceived Susceptibility n (%) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Never | Sometimes | Often | Always | Am Never in This Setting | Unsure |
| Classroom | 1213 | 164 (13.5) | 530 (43.7) | 172 (14.2) | 47 (3.9) | 256 (21.1) | 44 (3.6) |
| Indoor sporting events | 1185 | 157 (13.2) | 337 (28.4) | 122 (10.3) | 57 (4.8) | 492 (41.5) | 20 (1.7) |
| Outdoor sporting events | 1184 | 333 (28.1) | 322 (27.2) | 61 (5.3) | 15 (1.3) | 436 (36.8) | 17 (1.4) |
| Bars and clubs | 1186 | 111 (9.4) | 264 (22.3) | 206 (17.4) | 125 (10.5) | 469 (39.5) | 11 (0.9) |
| On-campus dining facilities | 1185 | 163 (13.8) | 375 (31.6) | 131 (11.1) | 41 (3.5) | 458 (38.6) | 17 (1.4) |
| Academic building SMALL gatherings (≤10) | 1185 | 198 (16.7) | 625 (52.7) | 76 (6.4) | 28 (2.4) | 238 (20.1) | 20 (1.7) |
| Academic building LARGE gatherings (≥11) | 1184 | 158 (13.3) | 415 (35.1) | 173 (14.6) | 48 (4.1) | 371 (31.3) | 19 (1.6) |
| University library | 1183 | 250 (21.1) | 476 (40.2) | 79 (6.7) | 19 (1.6) | 335 (28.3) | 24 (2.0) |

to determine because it can help shape the way health professionals advocate for face coverings and other protective actions. Understanding whether interpersonal beliefs trump intrapersonal beliefs will allow health professionals to create more effective health campaigns. For instance, if university students highly value interpersonal beliefs, then institutions can center their campaigns around protecting others rather than themselves. That way, universities may see students take more actions that favor prevention and protection such as wearing face coverings.

### *Limitations*

As with all scholarly survey work, limitations arose. Due to the nature of self-reported data, there is some degree of response bias because participants might respond inaccurately or in the way they believe the researchers would want. There are also issues with generalizability as these data are not representative outside of the population studied. Because CMU comprised most of the final sample, these data may be more representative of the perspectives of that university. Secondly, there was a slight setting error with the formatting of a question. For the question, "Which of the following make it difficult for you to wear a face covering? (check all that apply)," the “check all that apply” option was not turned on in Qualtrics for the first 24-hours of data collection. This edit was made as soon as the issue was identified, and participants who received the incorrect version were not included in the final sample. In the end, only 93 survey responses were impacted, resulting in a sample size of 990 for the final question in Table 2. As this did not impact the analysis, the subjects were included in the final results. Additionally, there were challenges in consistent dissemination across universities. CMU was unable to send the survey out to all students during the initial week of distribution due to an email cap. Moreover, additional open-ended response options may have been helpful. Although time-consuming for

**Table 4**

*Perceived Intent of Wearing Face Coverings*

| Setting | N | Perceived Likelihood n (%) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Never | Sometimes | Often | Always | Am Never in This Setting | Unsure |
| Classroom | 1179 | 43 (3.6) | 40 (3.4) | 56 (4.7) | 882 (74.8) | 148 (12.6) | 10 (0.8) |
| Indoor sporting events | 1164 | 70 (6.0) | 83 (7.1) | 53 (4.6) | 424 (36.4) | 528 (45.4) | 6 (0.5) |
| Outdoor sporting events | 1164 | 249 (21.4) | 159 (13.7) | 80 (6.9) | 209 (18.0) | 463 (39.8) | 4 (0.3) |
| Bars and clubs | 1166 | 118 (10.1) | 137 (11.7) | 71 (6.1) | 244 (20.9) | 585 (50.2) | 11 (0.9) |
| On-campus dining facilities | 1163 | 68 (5.8) | 89 (7.7) | 81 (7.0) | 375 (32.2) | 541 (46.5) | 9 (0.8) |
| Academic building SMALL gatherings (≤10) | 1166 | 74 (6.3) | 69 (5.9) | 66 (5.7) | 704 (60.4) | 249 (21.4) | 4 (0.3) |
| Academic building LARGE gatherings (≥11) | 1166 | 62 (5.3) | 60 (5.1) | 50 (4.3) | 605 (51.9) | 384 (32.9) | 5 (0.4) |
| University library | 1166 | 57 (4.9) | 76 (6.5) | 57 (4.9) | 636 (54.5) | 333 (28.6) | 7 (0.6) |

**Table 5**

*Perceived Severity of COVID-19*

| Severity Belief | N | Perceived Severity n (%) | | | | |
|---|---|---|---|---|---|---|
| | | Not Serious | Somewhat Serious | Serious | Very Serious | Unsure |
| Belief in seriousness of COVID-19 | 1219 | 110 (9.0) | 242 (19.9) | 254 (20.8) | 610 (50.0) | 3 (0.2) |
| Belief in seriousness of COVID-19 if contracted | 1218 | 444 (36.5) | 349 (28.7) | 201 (16.5) | 176 (14.4) | 48 (3.9) |

data analysis, allowing students to write in some of their responses may have offered insight regarding participants' motivations for their actions or opinions. Lastly, the inclusion of questions about wearing face coverings and vaccination were excluded, creating a research gap.

**Table 6**

*Face Covering Behavior*

| Face Covering Behavior | N= 1212<br>n (%) |
|---|---|
| How often forget to wear a face covering | |
| Never | 714 (58.9) |
| Sometimes | 333 (27.5) |
| Often | 62 (5.1) |
| Very often | 103 (8.5) |

**Table 7**

*Self-efficacy Associated with Wearing Face Covering*

| Confidence with Face Coverings | N | Low Confidence<br>n (%) | High Confidence<br>n (%) |
|---|---|---|---|
| Ability to wear face covering | 1218 | 96 (7.9) | 1122 (92.1) |
| Selecting a protective face covering | 1217 | 270 (22.2) | 947 (77.8) |
| Access to a face covering | 1216 | 73 (6.0) | 1143 (94.0) |
| Remembering to wear a face covering | 1215 | 173 (14.2) | 1042 (85.8) |
| Wearing a face covering correctly | 1216 | 93 (7.6) | 1123 (92.4) |
| Wearing a face covering in social settings | 1213 | 370 (30.5) | 843 (69.5) |

## Conclusion

As universities prepare for a new school year and COVID-19 cases continue to rise, universities' COVID-19 policies likely need to be re-evaluated. They may also want to continue, modify, or reinstate face covering policies. With the upsurge in COVID-19 cases, the face coverings that many had hoped would become irrelevant have been remerging and likely will be remaining for some time (Centers for Disease Control and Prevention, 2022). Though some individuals experienced a short "break" from face coverings during the summer of 2021 and perhaps believed they would not be needed during the 2021-2022 school year, this reprieve was short-lived. The difficulty could be that, during that time, perceptions might have changed and negative associations with face coverings increased. With worsening COVID-19 conditions, many of the conclusions that can be drawn from these data could be crucial in maintaining the health and well-being of college students across the United States.

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HEALTH EDUCATION MONOGRAPH SERIES

# Mask Wearing Surveillance on a University Campus

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**Abstract**

During February-April 2021, Western Michigan University's Eta Sigma Gamma-Gamma Mu chapter participated in the Centers for Disease Control and Prevention's (CDC) nationwide Mask Adherence Surveillance at Colleges and Universities Project (MASCUP!). Participation in this project provided the university valuable information to be used to direct COVID-19 related health messaging such as the proportion of mask adherence on campus, plus student opinions on mask wearing, COVID-19 testing, and COVID-19 vaccinations. ESG Gamma Mu members participated as coordinators and student observers for this project. Through the surveillance portion of the project, data collected estimated the proportion of mask wearing on campus. Of 1,527 observations, 1,505 (98.4%) wore masks and 1,426 (93.4%) wore masks correctly. After surveillance concluded, a CDC-created questionnaire regarding mask use, COVID-19 testing, and COVID-19 vaccinations was emailed to students. Results showed that most of the 624 student responses viewed mask wearing as beneficial, had previously been tested for COVID-19, and were already vaccinated at the time of the questionnaire.

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GAMMA MU

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## Introduction

Since mid-March 2020, when COVID-19 first impacted Western Michigan University (WMU), the Gamma Mu chapter members of Eta Sigma Gamma (ESG) have been dedicated to serving the WMU community in its response to the pandemic. At the onset, Gamma Mu was actively involved with the university's COVID-19 Crisis Response Task Force (Bensley et al., 2021) and transitioned to serving as COVID-19 contact tracers for WMU and starting a COVID-19 student coalition. When presented with the opportunity to participate in the Centers for Disease Control and Prevention's (CDC) Mask Adherence Surveillance at Colleges and Universities Project (MASCUP!), Gamma Mu members again agreed to serve their university community.

MASCUP! was a national CDC-directed COVID-19 surveillance project intended to measure the percentage of mask usage on college and university campuses across the nation. WMU was one of 60 institutions of higher education to partner with CDC on this project. The purpose of participating was to gain information and insight to guide COVID-19 related health messaging for the WMU community. MASCUP! was able to answer questions such as: What proportion of those on campus are wearing masks? What

proportion of those on campus are wearing masks correctly? What type of masks are those on campus wearing? How do the students feel about mask wearing, COVID-19 testing, and COVID-19 vaccinations? WMU was able to answer these questions through the two stages of this project: First through surveillance and then through the distribution of a CDC-created questionnaire.

During surveillance, estimate proportions of mask wearing, correct mask usage, and type of mask used were collected by student observers. These data were reported weekly to the CDC as a part of the national surveillance project and disseminated to the WMU community through weekly infographic updates. The information contributed by the MASCUP! team regarding campus mask usage helped inform WMU's central administration public health related decisions. When the surveillance portion of MASCUP! concluded, a CDC-created questionnaire regarding mask use, COVID-19 testing, and COVID-19 vaccinations was distributed to the student body.

The goal of all COVID-19 related student efforts focused on keeping the campus safe for in-person classes for as long as possible. After the unexpected shift online following the 2020 spring recess, WMU made the decision for fall 2020 to start the semester with in-person classes until transitioning to a remote learning environment after Thanksgiving recess and after spring recess again in 2021 (Montgomery, 2020). This transition was wise given that in the 2-week period from October 30 to November 13, 2020, WMU's COVID-19 testing positivity rate rose exponentially from 1.2% testing positive on the 30th to 14.9% testing positive on the 13$^{th}$, so in-person classes may not have been safe after Thanksgiving travels (Western Michigan University, 2020).

WMU used data like the COVID-19 testing positivity rates and the mask adherence data collected by MASCUP! to help guide their COVID-19 response for the campus community. The WMU community was very supportive of this project and reported the mid-project findings in the university's official news source, WMU News. The article highlighted the rate of mask usage (98%) and correct mask wearing (97%) at WMU far exceeded the average rate of mask usage (85.5%) and correct mask wearing (89.7%), as reported from the MASCUP! pilot study that took place from September to November 2020 (Looker, 2021).

The purpose of this paper is to share the findings of the WMU MASCUP! project to add to the limited body of knowledge about mask wearing on college campuses, to be a resource to other institutions or ESG chapters that may want to institute a similar project, and to highlight the valuable contributions of student ESG members to university wide public health efforts.

## Methods

MASCUP! WMU was implemented using the surveillance process outlined by CDC. Two student coordinators and 15 student observers made up the CDC-trained MASCUP! team, 90% of which were present or past Eta Sigma Gamma members. The two student coordinators managed the training of observers, creation of the data collection instrument, determination of observation sites, student observation scheduling, data entry, project communication, and dissemination of WMU's weekly statistics to the community. The student observers conducted weekly surveillance in 17 different campus locations. These locations were determined by the MASCUP! WMU team coordinators, who narrowed down the location pool by scouting buildings to make sure they fit criteria for inclusion, such as being greater than 20,000 square feet, containing classrooms or student resources, or having moderate foot traffic. A random selection of qualifying locations for surveillance determined the final 17 data observation sites.

Surveillance occurred weekly across all locations for 8 weeks between February 15 and April 9, 2021, after which the campus transitioned to a fully remote learning environment. Student observers were instructed to collect data on every third person whose face was visible that passed or entered their location. They were to record whether the person was wearing a mask, wearing a mask correctly (according to CDC definition), and the type of mask they were wearing. The mask categories were determined by the CDC to be cloth, N95/K95, surgical masks, and gaiters. WMU independently collected information on whether a person was "double masking" or wearing two masks at once. If double masked, the observers were instructed to record the outer mask type, so that it could be accurately identified. These data were collected from the student observers by the project coordinators and recorded weekly in the CDC's REDCap data entry program and uploaded to the CDC. Once data were analyzed by the CDC, weekly reports were returned to each school.

In addition to the surveillance portion of MASCUP!, a questionnaire regarding COVID-19 testing, mask usage, and COVID-19 vaccinations was administered to WMU undergraduate and graduate students. This questionnaire was distributed to students in April 2021 through the university's email system by WMU staff. The questionnaire was completed online, and the responses were received directly by CDC. Once the responses were collected, the CDC sent WMU's responses to WMU's MASCUP! team. Results from descriptive analysis are presented below.

## Results

A total of 1,527 observations were recorded by student observers during the 8-week data collection period. Of those, 98.4% wore masks and 93.4% wore their masks correctly. There was very little variation in the proportion of observed individuals with correct mask usage from Week 1 to Week 7 (93.8% +/- 1%), and the differences per week were not statistically significant (F = .651, p = .714). Little variance was found across the weeks regarding properly wearing a mask among mask users (see Figure 1).

**Figure 1**

*Number Observed and Number Wearing Masks Correctly by Week*

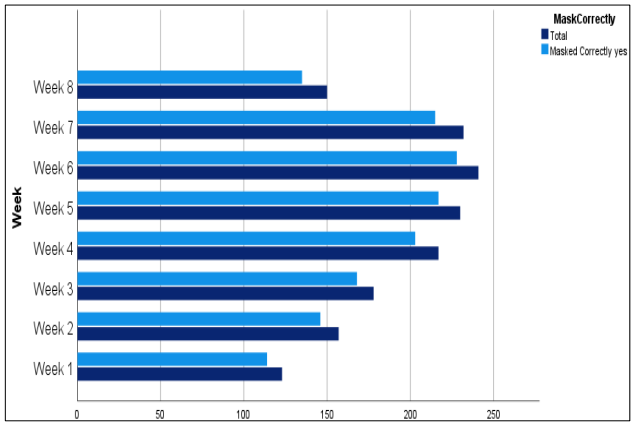
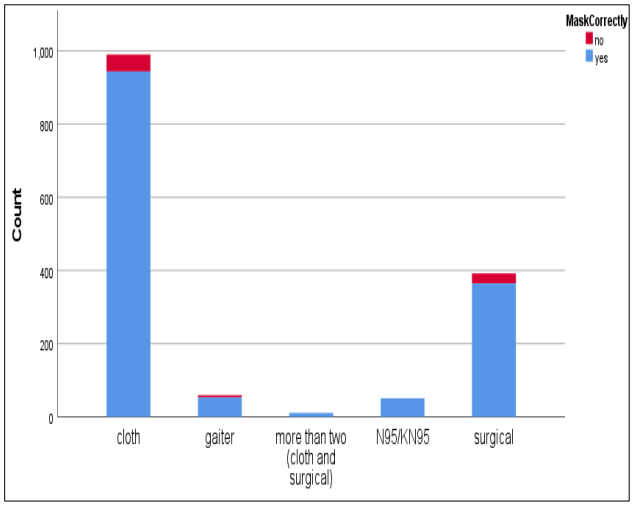



**Figure 2**

*Type of Mask Worn and Proportion Worn Correctly*




### *Type of Mask Worn*

The most common mask type observed was cloth (n = 1,002), followed by surgical (n = 394), N95/K95 (n = 51), and gaiters (n = 59). Only 11 of these observations were indicated to have double masks. Correct mask usage varied significantly ($p < .05$) by mask type as indicated in Figure 2. All observations of N95/K95 and double masks were reported to be correctly worn, followed by correct wearing of 95.4% of cloth masks, 93.1% of surgical masks, and 89.8% of gaiters.

### *Questionnaire Responses*

After the conclusion of the surveillance portion of MASCUP!, the CDC created a questionnaire about mask usage, COVID-19 testing, and COVID-19 vaccinations. This questionnaire was administered in April 2021 by email to WMU undergraduate and graduate students, resulting in 624 responses. Selection options and groupings were set by the CDC. All questions included in the questionnaire are displayed in Table 1, Table 2, and Table 3.

**Table 1**

*Participants in CDC MASCUP! Questionnaire*

| Characteristic | Response | n<br>N = 624 | % |
|---|---|---|---|
| Age group (years) | 17-22 | 349 | 55.9 |
| | 23-30 | 160 | 25.6 |
| | 31-40 | 50 | 8.0 |
| | > 40 | 45 | 7.2 |
| | Missing | 20 | 3.2 |
| Race | Asian | 23 | 3.7 |
| | Black | 16 | 2.6 |
| | White | 548 | 87.8 |
| | Two or more | 17 | 2.7 |
| | Other | 19 | 3.0 |
| | Missing | 1 | 0.1 |
| Residence | On-campus | 52 | 8.3 |
| | Off-campus | 511 | 81.9 |
| | Other/missing | 61 | 9.8 |
| Status | Undergraduate | 443 | 71.0 |
| | Graduate/Professional | 177 | 28.4 |
| | Missing | 4 | 0.6 |

**Table 2**

*Mask Wearing Survey Questions*

| Question | Response | n<br>N = 624 | % |
|---|---|---|---|
| Wearing any type of mask is better than not wearing any mask at all. | Strongly agree | 382 | 61.2 |
| | Somewhat agree | 138 | 22.1 |
| | Neither agree nor disagree | 42 | 6.7 |
| | Somewhat disagree | 33 | 5.3 |
| | Strongly disagree | 27 | 4.3 |
| | Missing | 2 | 0.3 |
| Wearing a mask violates my civil liberties. | Strongly agree | 35 | 5.6 |
| | Somewhat agree | 40 | 6.4 |
| | Neither agree nor disagree | 59 | 9.5 |
| | Somewhat disagree | 45 | 7.2 |
| | Strongly disagree | 442 | 70.8 |
| | Missing | 3 | 0.5 |
| Wearing a mask protects others if I have COVID-19 infection. | Strongly agree | 324 | 51.9 |
| | Somewhat agree | 171 | 27.4 |
| | Neither agree nor disagree | 38 | 6.1 |
| | Somewhat disagree | 53 | 8.5 |
| | Strongly disagree | 37 | 5.9 |
| | Missing | 1 | 0.2 |
| Wearing a mask protects me if others around me have a COVID-19 infection. | Strongly agree | 436 | 69.9 |
| | Somewhat agree | 124 | 19.9 |
| | Neither agree nor disagree | 24 | 3.8 |
| | Somewhat disagree | 22 | 3.5 |
| | Strongly disagree | 17 | 2.7 |
| | Missing | 1 | 0.2 |

*Respondent Characteristics*

Table 1 presents the self-reported respondent characteristics. The majority of the 624 respondents were undergraduate students (71.0%, n = 443), living off campus (81.9%, n = 511), of White race (87.8%, n = 87.8), and between 17-22 years old (55.9%, n = 349).

*Mask Wearing*

Table 2 depicts responses regarding mask wearing. Most student respondents (83.3%, n = 520) somewhat agree or strongly agree that wearing any type of mask is better than not wearing a mask at all (61.2%, n = 382 strongly agree, 22.1%, n = 138 somewhat agree). The survey also found that 78% of respondents disagreed (70.8%, n = 442 strongly disagree, 7.2%, n = 45 somewhat disagree) that wearing a mask violates their civil liberties, while only 12% (n = 75) somewhat or strongly agreed with the statement. Most of the respondents agreed that wearing a mask protects others if the wearer has a COVID-19 infection (51.9%, n = 324 strongly agree, 27.4%, n = 171 % somewhat agree). Nearly every student respondent agreed that wearing a mask would protect themselves if others around them had a COVID-19 infection (69.9%, n = 436 strongly agree, 19.9%, n = 124 somewhat agree).

*Testing and Vaccination*

Results regarding COVID-19 testing showed the majority of the 624 student respondents had been tested for COVID-19 (83%, n=518), while of the 17% (n = 106) who indicated they have not or would not be tested, the most commonly cited reasons included testing being perceived as uncomfortable or painful (56.6%, n = 60), disbelief that testing was necessary (48.1%, n = 51), or getting tested is inconvenient (46.2%, n = 49). When asked about vaccination status, 68.6% (n = 428) indicated they were already vaccinated (see Table 3). Of the 31.4% (n = 192) students not vaccinated,

21.9% (n = 42) indicated they would definitely not be vaccinated, 25.5% (n = 49) indicated it was unlikely they would be vaccinated, 18.8% (n = 36) indicated they were not sure if they will be vaccinated, 31.3% (n = 60) indicated that they would most likely be vaccinated, and 3.1% (n = 6) indicated that they most likely would be getting vaccinated once it is available to them. The top reasons among why respondents were not vaccinated included worry about the side effects of the vaccine (39.9%, n = 77), concern that vaccine is risky because approval was rushed (36.6%, n = 70), and perception of being at low risk for severe COVID-19 illness (33.7%, n = 65).

## Discussion

Compared to the other institutes of higher education (IHE) involved in the CDC MASCUP! project, WMU reported among the highest for rates of mask wearing and correct usage. WMU reported a mask usage rate of 98.4% and a correct mask usage rate of 93.4%. To compare, the University of Michigan reported a 95% rate of mask usage with 93% wearing their masks correctly, Colorado University Boulder reported 96% rate of mask usage with 91% wearing their masks correctly, and Stockton University reporting 92.5% rate of mask usage with 92.5% wearing their masks correctly (Galloway, 2021; Marshall, 2021; University of Michigan, 2021).

Though the reach of CDC MASCUP! was vast, with over 60 participating IHE nationwide, it seems to be one of the only ongoing projects of its type, or perhaps, the only with current publications. A search for mask adherence observation projects on college campuses yields results from many IHE, but all as installations of CDC MASCUP!. Participation in this project and the publication of the resulting findings is a necessary addition to an area that currently lacks sufficient data. Additional direct observation studies by other universities with varying methods of data collection and research questions would complement the information provided with CDC MASCUP! efforts. Projects that explore

**Table 3**

*COVID-19 Testing and Vaccination*

| Question | Response | n<br>N = 624 | % |
|---|---|---|---|
| Tested for COVID-19 (N=624) | Yes | 518 | 83.0 |
| | No | 106 | 17.0 |
| Reasons have not/would not get tested (N=106)<br>*Multiple responses allowed | Testing may be uncomfortable or painful | 60 | 56.6 |
| | Don't think it's necessary | 51 | 48.1 |
| | Getting tested is inconvenient | 49 | 46.2 |
| | Getting tested is too expensive | 42 | 39.6 |
| | Don't want to have to isolate if positive | 36 | 34.0 |
| | Others might avoid or tease me | 6 | 5.7 |
| Vaccinated against COVID-19 (N=624) | Yes | 428 | 68.6 |
| | No | 192 | 30.8 |
| | Missing | 4 | 0.6 |
| When vaccine available likely to get vaccinated (N=192) | No, definitely not | 42 | 21.9 |
| | Unlikely | 49 | 25.5 |
| | Maybe/not sure | 36 | 18.8 |
| | Most likely | 60 | 31.3 |
| | Yes, definitely | 6 | 3.1 |
| Reasons for not getting vaccinated (N=192)<br>*Multiple responses allowed | I'm worried about unknown side effects | 77 | 39.9 |
| | It's risky because approval was rushed | 70 | 36.3 |
| | I'm at low risk for severe COVID-19 illness | 65 | 33.7 |
| | Concerned that the vaccine has a hidden purpose | 17 | 8.8 |
| | Too hard to get an appointment | 11 | 5.7 |
| | I think all vaccines are dangerous | 4 | 2.1 |
| | It's against my religious beliefs | 4 | 2.1 |

mask adherence in relation to gender, outdoor temperature, COVID-19 testing positivity rate, and timing of university-wide health messaging efforts would gather valuable insight into the factors that affect mask adherence on college campuses.

Though other IHE may not be enacting independent mask adherence observation studies, similar projects are taking place in locations across the country. Marion County, Indiana and the City of Philadelphia, Pennsylvania have published findings from two such systematic direct observation of mask adherence studies. In Marion County, which includes Indianapolis, observation sites were geographically dispersed across the county to accurately capture socioeconomic, racial, and ethnic diversity, in addition to a range of settings, communities, and public activities. Mask adherence was observed in individuals who appeared to be over the age of two whose faces were fully visible. For each observation a status of "non-masked", "partial-masked", or "masked" was recorded. This study found that 80% of adults wore face masks correctly, and 9% were partially masked. Additionally, mask wearing was found to be higher among females (84%) than males (76%) and males had a higher percentage of partial mask-wearing (Vest et al., 2021).

In Philadelphia, observations were conducted in three types of outdoor spaces – walking paths/sidewalks, neighborhood parks, and playgrounds. Observers recorded the status of mask wearing, physical distancing, gender, age group, race/ethnicity, physical activity level, and location of each individual. This study found that overall, 43% of individuals wore masks, 17% wore them incorrectly, 40% did not wear masks at all, and 42.8% kept over 6 feet of distance from others. The comparatively low rate of mask usage could be attributed to in part that this study solely observed outdoor locations. This study also found that females (51.4%) were more likely to wear masks than males (36.6%), in addition seniors were more likely to wear masks correctly, and Asians were the most adherent mask wearers (Cohen et al., 2021).

When compared to the observations conducted of the general public, the mask usage rate on college campuses was significantly higher. The additional data collected by the studies in Marion County and Philadelphia, such as gender and race/ethnicity, would have provided valuable insight for the college campuses to create more effective directed messaging. In future direct observation studies of mask adherence, systematic collection of both physical status, such as mask usage, correct mask usage, physical activity level, and location, as well as individual characteristics, such as gender, age group, and race/ethnicity, would provide more in-depth information to create better tailored health messaging.

## Conclusion

Results indicated, in general, that WMU students were abiding with mask use and proper mask wearing. Beliefs about the importance of mask wearing were higher than that of testing, which in turn were higher than that of getting vaccinated. This knowledge is valuable to WMU because it allows the central administration to utilize effective health communication strategies to tailor health messaging. Knowing that most students are wearing masks but fewer are wearing them correctly, allows WMU to focus their messaging on correct mask usage and using effective types of masks. Understanding the student population's attitudes and beliefs towards COVID-19 testing and vaccination, empowers WMU to create messaging that addresses the concerns of its students and encourages vaccination as a social norm.

Through participation and leadership in MASCUP!, WMU students and ESG Gamma Mu members gained experience in data collection, data management, public health surveillance fieldwork, results/information dissemination, and team management. This project provided valuable learning opportunities about data analysis, study design and surveillance best practices. ESG members finished this project with practical experience and important skills needed for emerging public health professionals. If given the opportunity, other ESG chapters should spearhead MASCUP! or similar efforts at their institutions. Not only will this aid in the development of their members, but it will provide the institution with necessary understanding of the status of mask adherence on their campus and insight into the attitudes, beliefs, and intentions of their students regarding COVID-19 testing and vaccinations. The valuable contributions made by the MASCUP! WMU team will shape the mask policy and COVID-19 related messaging for both WMU and other colleges and universities as future epidemics arise.

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HEALTH EDUCATION MONOGRAPH SERIES

# News Source, Political Party Affiliation, Perceived Risk, and COVID-19 Vaccine Hesitancy

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## Abstract

To reduce the spread of COVID-19, health educators have recommended the use of preventive behaviors such as wearing a face mask, social distancing, and vaccination. However, some individuals are following these recommendations and others are not. The purpose of this study was to examine how news source, political party affiliation, and perceived risk/severity affect COVID-19 preventive behaviors among adults. A random sample of adults in the United States (n = 408) completed an online survey in February 2021 to measure perceptions of risk and severity of COVID-19, news source, political party affiliation, frequency of preventive behaviors, and intention to obtain a COVID-19 vaccination. Results yielded that intention to obtain a COVID-19 vaccination and frequency of other preventive behaviors were related to perceptions of risk and severity of COVID-19 infection and differed by participants' main news source and political party affiliation. This suggests that health educators should consider the role of perceived risk/severity, politics, and news sources in addressing vaccine hesitancy.

*Robert G. LaChausse*
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## Introduction

The COVID-19 pandemic has had a devastating effect on the lives of adults and their families in the United States. As of March 2021, over 500,000 deaths were reported in the United States (World Health Organization [WHO], 2021). Before the availability of the COVID-19 vaccine, public health officials encouraged the public to take preventive measures such as face masks, social distancing, and hand washing. Since March 2021, COVID-19 vaccinations have been widely available to adults in the United States. Nonetheless, as of March 2021, only 16% of adults in the U.S. had been fully vaccinated and the public's use of wearing face masks and social distancing had declined (Ritchie et al., 2021). At the same time, the proportion of adults who said they are unlikely to obtain a COVID-19 vaccination or take other preventive measures had remained stagnant, and some research suggested this may be due to demographics and psychosocial factors that affect perceptions of risk of COVID-19 infection (Szilagyi et al., 2021). Therefore, the purpose of this study was to examine how news source, political party affiliation, and perceived risk/severity affect COVID-19 preventive behaviors including vaccination rates among adults.

The Health Belief Model (HBM) has been widely used in health education and promotion as the theoretical basis to nudge people to take preventive action including flu vaccinations, sunscreen use, and preventive exams like mammograms (Jones et al., 2015; Rosenstock, 1974). This model posits that an individual's perceptions can predict the likelihood of taking preventive action to reduce morbidity or mortality. These perceptions include perceived susceptibility (how likely one is to get a disease), perceived severity (how bad it would be if one got the disease), benefits to action (effectiveness of taking action), barriers to action (obstacles to taking action), and cues to action (external cues that affect perceptions). Several factors are thought to affect perceptions of risk/severity as well as perceptions of the benefits

and barriers to taking action and cues to action including gender, ethnicity, age, social economic status (SES), and other psychosocial factors (Jones, Smith, & Llewellyn, 2014). What is less known, however, is the effect of ideology, including political party affiliation, on risk perceptions, cues to action and ultimately, intention to take preventive action particularly with infectious diseases like COVID-19.

Available findings at the time of this study regarding the effect of political party affiliation on risk perceptions was lacking. Partisan differences, which have held true since the outbreak began, have continued to widen, and this may be related to COVID-19 vaccine hesitancy (Bhochhibhoya et al., 2021). In fact, Dryhurst et al. (2020) found that political ideology was a significant factor in predicting perceptions of COVID-19 risk in North America, Europe, and Asia. Specifically, they discovered that lower COVID-19 risk perceptions were found in more conservative leaning individuals in Europe and the U.S. while in Mexico and South Korea, conservative ideology was associated with greater perceptions of COVID-19 risk. More recent research examining political ideology in the United States suggests Republicans perceive themselves to be at lower risk to get COVID-19 when compared to Democrats and Independents (Bhochhibhoya et al., 2021).

Where and how people obtain information about the pandemic, vaccinations, and other preventive measures is a key component of vaccination decision-making. For instance, Ruiz and Bell (2021) examined differences in vaccine uptake based on the source of knowledge regarding COVID-19. They found no significant effect of COVID-19 related knowledge and traditional television news network sources. However, their study did not examine from where people *typically* get their news including social media sources, and how this shapes political ideology, perceptions of risk or severity, and intention to obtain a COVID-19 vaccination.

COVID-19 information disseminated on social media can contain misinformation, spread quickly, and be widely distributed affecting individuals' beliefs about the risk of the disease and the effectiveness of preventive measures (Rathinaswamy et al., 2020). Moreover, repeated exposure to information (and misinformation) about COVID-19 (a function of many algorithms used by social media platforms) can be problematic because opposing viewpoints are rarely explored, and the information presented seldom undergoes a "fact-check" or even passes the traditional peer preview process (Cinelli et al., 2020). Additionally, individuals increasingly rely on social media sources for their news with some estimates indicating that almost 75% comes from social media sites (Oeldorf-Hirsch & Sundar, 2015). The reliance on social media sources may be related to COVID-19 preventive behaviors. For example, some researchers have showed that those who hold more negative views about COVID-19 preventive behaviors typically rely on social media sources and are more likely to be conservative (Rathinaswamy et al., 2020; Grinberg et al., 2019).

Public health efforts to encourage individuals to take preventive action have frequently relied on the HBM to increase perceptions of risk and severity, decrease perceptions of barriers, and increase perceptions of benefits to increase behavioral intention, and, in turn, facilitate behavior change (i.e., vaccine uptake). What is less known, however, is how demographic, psychosocial determinates, and cues to action (i.e., news source) affect these perceptions. Therefore, it is hypothesized that perceived risk and severity of COVID-19 would be related to intention to obtain a COVID-19 vaccination and other preventive behaviors. Moreover, perceptions of risk and severity would differ by political party affiliation. Finally, it was hypothesized that intention to obtain a COVID-19 vaccination would depend on political party affiliation and main source of news.

## Method

### *Participants and Procedures*

A convenience sample of participants was recruited to participate in a cross-sectional study using invitations online (Twitter, You Tube, and Facebook) in February 2021. In addition, the research team disseminated flyers with information about the study to individuals outside and inside retail coffee shops in Southern California. Eligibility to participate in the study included adults ages 18-65 years who provided voluntary consent to participate. Sample size was calculated a priori by the researchers to ensure adequate statistical power to find study effects. This calculation used an estimated effect size of .12 (Cohen's d) based on a previous study examining perceived risk/severity of flu and flu vaccinations (Ratnapradipa et al., 2017), power at .80, and alpha set at .05 (two-sided). This resulted in a required sample size of approximately 400 participants. Participant consent was obtained using an online consent form that explained the nature of the study, voluntary nature of participation, contact information of the faculty advisor, time commitment, risks and benefits, and confidentiality of data. This study was reviewed and approved by the Institutional Review Board at California Baptist University.

### *Instrumentation*

Participants completed an anonymous online survey using Qualtrics, which included items relating to HBM and COVID-19 infection, intention to obtain a COVID-19 vaccination, and the self-report of taking preventive measures to avoid COVID-19 infection (e.g., wearing a mask,

avoiding crowds). To measure those constructs of the HBM, items were adapted from Ratnapradipa et al.'s (2017) study, which examined the use of the HBM in predicting flu-related preventive measures. These five items asked respondents to identify the extent to which they agreed or disagreed with getting sick (perceived risk), dying (perceived severity), trust in healthcare providers (barriers/benefits), side effects of the vaccine (barriers/benefits), and knowledge of where to get a COVID-19 vaccine (cues to action). For example, "If I got COVID-19, I could get really sick" (1= Strongly agree to 5= Strongly disagree). These items revealed strong test-retest reliability (α = .84 to .93).

Three items measured how often participants used preventive measures to reduce exposure to COVID-19 including wearing a face mask and avoiding crowds both indoors and outdoors. For example, "How often do you wear a facemask around others indoors?" (1= Never to 5= Always). Two items measured COVID-19 vaccination behaviors: "Have you received a COVID-19 vaccination (at least one)?" (Yes/No), and "Do you plan to get a COVID-19 vaccination in the next year?" (Yes/No). These items demonstrated strong test-retest reliability (α = .93 and .88, respectively). Participants were asked, "Where do you typically get your news?" (Facebook, Twitter, Fox News, MSNBC, CNN, OAN, NPR, Newsmax, or local print/online news). For the purposes of this study, responses were recoded into a separate variable with four separate categories: liberal (MSNBC, CNN), conservative (Fox News, OAN, Newsmax), social media (Twitter, Facebook), and Neutral (NPR, Local News), and used for analyses.

Demographics were collected by asking participants about their gender (limited to male/female), marital status, race, ethnicity, age, political party affiliation (limited to Democrat or Republican), and level of education. No other response categories for gender or political party affiliation were presented. The survey had a Flesch-Kincaid readability grade level equivalent of grade five using procedures described in Lenzner (2014) and took ~ 8 minutes to complete.

## Results

The sample ($n$ = 408) was primarily female (61%), single (58%), White (39%) and reported having some college or a college degree (74%). Approximately 57% of the sample was Democrat and 43% Republican with an average age of 33 years (SD=12.25). Thirteen percent of the sample had already received at least one dose of a COVID-19 vaccine and 10% had been diagnosed by a healthcare provider with COVID-19 (See Table 1). A review of the IP addresses (longitude and latitude) revealed study participants came from over 27 U.S. states with 70% of the sample from California and 30% outside California. Table 2 displays the means and standard deviations of COVID-19 perceptions. Table 3 shows means and standard deviations of preventive behaviors. Table 4 shows frequency and percentage of responses of behaviors and behavioral intention items. Findings were considered statistically significant if the p-value was less than .01 (two-sided) using the Bonferroni adjustment to reduce the possibility of a type 1 error because of the number of a priori hypotheses (Howell, 2011). Approximately 11% of cases had missing data on at least one variable of interest which was handled list-wise to ensure adequate statistical power.

### *Perceived Risk /Severity and COVID-19*

Independent samples t-tests were computed to determine if those who had received a COVID-19 vaccination had greater perceived risk and greater perceived severity than those who had not received a COVID-19 vaccination. A statistically significant difference between those who were vaccinated and those who were not was found for perceived

**Table 1**

*Demographics*

| | n | % |
|---|---|---|
| Gender | | |
| Male | 150 | 38.9 |
| Female | 236 | 61.1 |
| Marital status | | |
| Single | 228 | 58.9 |
| Married | 149 | 38.5 |
| Divorced/Widowed | 10 | 2.6 |
| Ethnicity | | |
| White | 179 | 46.3 |
| African American | 51 | 13.2 |
| Asian | 119 | 30.8 |
| Native Hawaiian | 8 | 2.1 |
| Other | 30 | 7.7 |
| Race | | |
| Hispanic | 84 | 22.0 |
| Non-Hispanic | 298 | 78.0 |
| Political party affiliation | | |
| Democratic | 206 | 56.6 |
| Republican | 158 | 43.4 |
| Educational level | | |
| High school graduate | 20 | 5.2 |
| Some college | 79 | 20.5 |
| Associates degree | 34 | 8.8 |
| Bachelor degree | 196 | 50.8 |
| Master degree | 51 | 13.2 |
| Doctorate | 6 | 1.6 |
| Age (*M/SD*) | 33.07/12.25 | |

**Table 2**

*Means and Standard Deviations of Perceptions*

| Item | Political Party Affiliation | n | Mean[a] | SD | t | df | p | Effect Size[b] |
|---|---|---|---|---|---|---|---|---|
| I am likely to get COVID-19. | Democratic | 206 | 3.01 | 1.21 | -4.63 | 361 | 0.001 | 1.13 |
| | Republican | 157 | 3.60 | 1.01 | | | | |
| If I got COVID-19, I could die. | Democratic | 206 | 3.06 | 1.23 | -4.98 | 361 | 0.001 | 1.24 |
| | Republican | 157 | 3.72 | 1.27 | | | | |
| The COVID-19 vaccine has a lot of side effects. | Democratic | 206 | 3.21 | 1.12 | 4.93 | 359 | 0.001 | 1.12 |
| | Republican | 155 | 2.63 | 1.12 | | | | |
| I trust health providers when they say that the COVID-19 vaccine is safe. | Democratic | 206 | 1.78 | 0.95 | 10.34 | 369 | 0.001 | 1.27 |
| | Republican | 155 | 3.09 | 1.41 | | | | |
| The COVID-19 vaccine is easy to get where I live. | Democratic | 206 | 2.54 | 1.20 | 1.62 | 359 | 0.06 | 1.08 |
| | Republican | 153 | 2.93 | 1.08 | | | | |

*[a] 1= Strongly Agree to 5= Strongly Disagree; [b] Cohen's d*

**Table 3**

*Means and Standard Deviations of Preventive Behaviors*

| Item | Political Party Affiliation | n | Mean[a] | SD | t | df | p | Effect Size[b] |
|---|---|---|---|---|---|---|---|---|
| How often do you do the following things: Wear a face mask? | Democratic | 206 | 4.74 | 0.51 | 10.19 | 362 | 0.001 | 0.92 |
| | Republican | 158 | 3.75 | 1.26 | | | | |
| How often do you do the following things: Avoid crowds indoors? | Democratic | 206 | 4.12 | 0.82 | 10.19 | 362 | 0.001 | 1.26 |
| | Republican | 158 | 2.94 | 1.38 | | | | |
| How often do you do the following things: Avoid public spaces, gatherings, and crowds? | Democratic | 205 | 3.78 | 0.97 | 8.47 | 361 | 0.001 | 1.19 |
| | Republican | 158 | 2.72 | 1.41 | | | | |

*[a] 1= Never to 5= Always; [b] Cohen's d*

**Table 4**

*Frequency and Percent of Behaviors and Behavioral Intent*

| Item | Political Party Affiliation | | | | | | News Source | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Republican* | | *Democrat* | | *Liberal* | | *Conservative* | | *Social Media* | | *Neutral* | |
| | n | % | n | % | n | % | n | % | n | % | n | % |
| Had already received a COVID-19 vaccination (at least one). | 4 | 8 | 45 | 92 | 13 | 36.1 | 4 | 11.1 | 9 | 25 | 10 | 27.8 |
| Had been told by a healthcare provider that they had COVID-19. | 24 | 53 | 21 | 47 | 7 | 15.9 | 13 | 29.5 | 15 | 34.1 | 9 | 20.5 |
| Intent on getting a COVID-19 vaccination in the next year. | 50 | 22 | 173 | 78 | 50 | 22.8 | 14 | 6.4 | 53 | 24.2 | 102 | 46.6 |

risk ($t(376) = 9.22$, $p < .001$) and perceived severity ($t(376) = 7.42$, $p < .001$). Those with greater perceived risk and severity were more likely to report having received the COVID-19 vaccine.

### *Political Party Affiliation and HBM Constructs*

Independent samples t-tests were computed to determine political party differences in perceived risk of obtaining COVID-19, perceived severity of COVID-19, trust in health care providers, perceptions of side effects, and ease of obtaining a vaccination. A statistically significant difference between Democrats and Republicans was found for perceived risk ($t(381) = 4.63$, $p < .001$), perceived severity ($t(381) = 12.19$, $p < .001$), trust in healthcare providers ($t(369) = 10.34$, $p < .001$), and perceptions of negative side effect of the vaccination ($t(369) = 4.93$, $p < .001$). No significant difference was found between Democrats and Republicans in their perception of ease in obtaining a COVID-19 vaccination ($t(359) = 1.63$, $p = .06$).

### *Mask Wearing and Social Distancing*

Independent samples t-tests were computed to determine political party differences and preventive measures for reducing the spread of COVID-19. A statistically significant difference between Democrats and Republicans was found for wearing a face mask ($t(362) = 10.18$, $p < .001$), avoiding crowds outside ($t(362) = 10.19$, $p < .001$), and avoiding crowds indoors ($t(361) = 8.47$, $p < .001$).

### *COVID-19 Vaccination Hesitancy, Political Party Affiliation, and Media Sources*

A chi-square test of independence was calculated to examine the relationship between intention to obtain a COVID-19 vaccination and main source of news media. A significant interaction was found ($X^2(3) = 75.14$, $p < .001$). Participants who intended on obtaining a COVID-19 vaccination and reported their main source of news was a liberal news source (27%) or neutral news source (45%) were more likely to intent on getting a COVID-19 vaccination than those whose main news sources was conservative (6%) or from social media (22%). Additionally, Democrats (78%) were more likely than Republicans (22%) to intent on obtaining a COVID-19 vaccination ($X^2(1) = 107.00$, $p < .001$). As a result, news sources and political party affiliation were related to intent on obtaining a COVID-19 vaccination.

## Discussion

This study sought to explore the relationship between perceived risk and severity of COVID-19 and intention to obtain a COVID-19 vaccination based on political party affiliation and news source. As expected, intention to obtain a COVID-19 vaccination and use of other preventive behaviors (e.g., wearing a mask) were related to perceptions of risk and severity of COVID-19 infection and differed according to news source and political party affiliation. Specifically, those respondents who had higher levels of perceived susceptibility and severity to COVID-19 infection were more likely to have obtained a vaccination. Preventive behaviors like wearing a face mask, social distancing, and intention to obtain a vaccination were higher among Democrats than Republicans. Those who typically got their news from more liberal or neutral media sources were more likely intent on obtaining a COVID-19 vaccination than those who mainly got their news from more conservative sources. These findings are consistent with recent research that has explored partisan differences in vaccine hesitancy and source of knowledge about the COVID pandemic (Bhochhibhoya et al., 2021; Dryhurst, et al., 2020). However, this

study adds to the health education and promotion literature by suggesting that political party affiliation (a demographic and social factor) is related to perceptions of risk, severity, benefits of taking action, and barriers to taking action. Furthermore, this study demonstrated that news sources, a typical cue to action, may influence intention to take preventive action.

The results of this study should be viewed in light of its strengths and limitations. The strengths of this study include reliable and valid measures of HBM constructs and behaviors and an adequate sample size and power. Limitations of this study include the generalizability of a convenience sample, use of the internet to recruit study participants, self-report behavioral data, and the lack of a research design to examine causal relationships between study variables. Furthermore, we limited the response categories when measuring where respondents typically get their news to those sources most frequently cited in the literature (Pew Research Center, 2020). Adults may obtain their news from other sources not measured in this study. However, this study provided an opportunity for health education students to apply real-world research and data analysis skills that pertained to an urgent public health pandemic. Future research should examine the differences between conservative and liberal news sources to identify how the frequency and duration of time spent watching a news source affects perceptions of risk and intention to obtain a COVID-19 vaccination.

There are several implications for health education and promotion practice. First, health educators should explore how demographic and psychosocial factors can affect perceptions of risk and severity of an infectious disease in their prevention work. Few anticipated the role of news source, political party affiliation, and health misinformation on taking preventive action during a pandemic. Second, the HBM may not be the best theoretical basis to use as the foundation of vaccine uptake efforts. Any use of the HBM should also help people understand the risks of exposure to health misinformation (Houlden et al., 2021). Other theories like the Social Norms Theory have shown effectiveness in flu vaccination uptake (Quinn et al., 2017). Social Norms Theory posits that individuals' perceptions of social norms (what people normally do) and perceptions of attitudes toward that behavior drive individuals to behave in accordance with those norms (Berkowitz, 2002). Perceptions of social norms, particularly those of individuals close to us (e.g., family, friends, co-workers), may increase the perception that getting a vaccine is what most people do because they think it is a good thing, and may increase vaccine uptake. Fourth, political ideology is difficult to change, and it may be that people maintain perceptions and behave in a way that allows them to maintain their group identity. Finally, this pandemic has brought to light the effects of health misinformation. Health educators should focus not only on reducing COVID-19 misinformation but also the broader influence of health misinformation in general (Houlden et al., 2021). Because of this, health educators should focus on increasing health literacy and critical thinking skills, and help people understand the dangers of exposure to health misinformation, so that when faced with another public health threat, people will have the skills to interpret media messages and take effective preventive action.

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HEALTH EDUCATION MONOGRAPH SERIES

# Establishing and Implementing a University-Based COVID-19 Coalition

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## Abstract

The COVID-19 Student Coalition is a university student-led group developed and operated mostly by undergraduate public health students. Coalition formation planning evolved during the summer of 2020 to compliment other campus COVID-19 mitigation efforts. Social media became the main avenue for sharing credible information to peers about the pandemic and vaccine. Other activities accomplished by the coalition included contact tracing, designing/posting informational flyers, and more. "Safe at WMU," the coalition's social media handle, became the common theme of their efforts to prevent the spread of COVID-19 at the university level. Additionally, media coverage and other recognition contributed to the impact of the coalition during the initial year of the pandemic.

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## Introduction

Like many institutions of higher learning, Western Michigan University (WMU) transitioned to being completely online in mid-March of 2020 when the potential of COVID-19 spread became a reality. As the spring and summer progressed, it was evident COVID-19 was not going to be contained. Consequentially, faculty and students needed to make plans for how best to engage with campus life prior to the start of the Fall 2020 semester. A graduate student sought ways to address COVID-19 as a means of demonstrating leadership in a project to fulfill a "WMU Signature" specialty on her diploma. She was directed to connect with the President of Gamma Mu chapter of Eta Sigma Gamma (ESG), who had been working as a public health student on the university's COVID-19 Contingency Planning Task Force. As a result, the WMU COVID-19 Student Coalition (CSC) was formed and became one of many COVID-19 focused initiatives within WMU. It was specifically formed as a means of providing students with opportunities to participate in the efforts in mitigating COVID-19 on campus.

The initial plans for the coalition were based on the importance of five factors: "social ties; organizational structures; ideology, culture, and identity; the institutional environment; and resources" (Van Dyke & Amos, 2017, p. 10). The social ties included students, professors, and other university employees. The organizational structure consisted of a few passionate student leaders, dedicated advisors, and highly motivated student members. The ideology aspect was the coalition's educational purpose during the pandemic, with a focus on vaccines and behavioral precautions. At the institutional level changes had to be made in everyone's lifestyle/routines.

Social media was earmarked as the main resource. Two principles steered the creation of social media posts, primarily telling human stories and using student-friendly language in messaging that appealed to emotions (Fielding &

Teutsch, 2017). Secondarily was the priority of positivity in wording messages, especially for the intention of appealing to a large audience with various opinions on the guidelines during the pandemic. The coalition attempted to create messages that mixed the notion of personal responsibility with that of opportunities (Fielding & Teutsch, 2017).

In founding the coalition, it was crucial to follow an evidenced-based approach to building alliance for action. The coalition was based on the recommendation of following two pillars: Prioritize risk and focus on protective factors to target change (Shapiro, et al., 2015). WMU and Kalamazoo County provided dashboards with recent data on COVID-19 tests and cases that were reviewed regularly to specifically address local changes and challenges. The first social media posts were centered on encouraging behavior change, such as frequent handwashing, mask wearing, getting vaccinated, and physical distancing.

In implementing the coalition, the leadership and advisors agreed to share and follow a collaborative, open, and explicit decision-making processes (Metzger, et al., 2005). All members would have influence, which was meant to grow a feeling of personal impact from participation as an involved coalition member and to continue participation.

Given the context of the university setting, the coalition could anticipate possible barriers while taking inventory of available assets at the start. Regarding how the coalition fit into this larger community, the coalition work had an emphasis on promoting healthy behaviors, which fit squarely into the counseling and education element at the top of the Health Impact Pyramid (Janosky, et al., 2013). The coalition became aware of other initiatives at the university, city and state levels that were addressing other social determinants of health and biomedical concerns in that model.

The goals of the CSC centered on helping educate WMU students about COVID-19, relaying university policy changes, sharing reliable information on the vaccines, mitigating COVID-19 spread, and encouraging healthy behaviors throughout the pandemic using social media accounts, under the handle "Safe at WMU." Social media platforms chosen include Instagram, Facebook, and Twitter. Example posts included busting vaccine myths and sharing updated guidelines from the Centers for Disease Control and Prevention (CDC).

As the Fall 2020 semester approached, it was unclear whether Western Michigan University planned to keep in-person learning or move to a completely online format. Students began to wonder whether their graduation date could be delayed. Would they be able to complete their practicums, labs, and other academic requirements designed with an in-person structure? Universities like Michigan State had made announcements they would be moving to an online format, followed by other universities and colleges in the state and around the U.S. The uncertainty of the pandemic's progression made students, faculty, and staff feel anxious. Students shared their opinions, and results from a survey by WMU indicated most students wanted to be on-campus for the Fall 2020 semester. Therefore, the purpose of forming this coalition was to foster a student-led effort to ensure that in-person education could continue while staying safe and healthy. A detailed description of the group's structure, activities, and impacts are discussed herein.

## Coalition Formation and Structure

The two founding students served as the coalition's coordinator and chair. In the early part of Fall 2020, the coalition leadership sought out additional members, which resulted in students from various disciplines (i.e., biomed, business, social work) joining, as well as public health students as a means of fulfilling a course requirement. Total membership of 34 at the coalition's peak included 15 public health major students, 11 of whom were active members of the ESG, and 19 members from non-public health majors. The main method of recruitment was through GroupMe, a group messaging app, so students could find the coalition through the Campus Connect feature, which identifies inclusive, campus-wide groups students can join. The coalition also distributed printed recruitment flyers in popular common areas. The coalition served as an ideal way for students to learn, in real time, during a pandemic how to build and run a coalition, as well as enhance health promotion and education skills. Four WMU employees, including two public health faculty and two staff from the WMU Office of Health Promotion and Education, served as advisors for the coalition. Due to the fast growth of the coalition, a third student was recruited to assist in running the coalition, resulting in expanding the chair role to co-chairs.

Coalition members were encouraged to join one or more of five committees, which included Projects and Events, Education and Resources, Recruitment and Outreach, Social Media, and Evaluation. Every week the committees would meet to delegate identified tasks among committee members. The chair of each committee regularly reported to the coalition co-chairs and the coordinator to provide feedback on the performance of their committees.

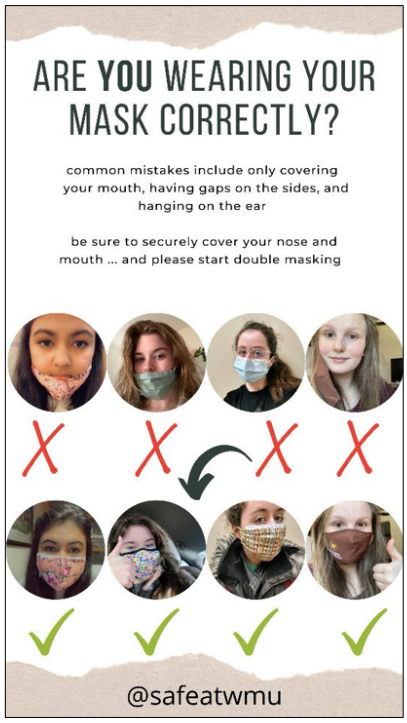
Due to the pandemic, the coalition functioned in a virtual mode for the 2020-2021 academic year. Weekly online meetings took place consisting of coalition members and faculty advisors. Except for certain marketing or recruitment events, all activities were conducted virtually. In an effort to have open communication with all the coalition members, a group email was established as the main source of communication and consisted of meeting presentation slides, recordings, and minutes. In addition, a shareable online folder

was created and used as a repository for all coalition work. The GroupMe chat continued to be used as a quick form of contact among members.

The coalition met for an hour once each week throughout the academic year. The leadership team created presentation slides to effectively communicate past successes, opportunities to improve, current events, and future ideas. Although the leadership team facilitated the meetings, collaboration and brainstorming from all members of the coalition was critical and highly encouraged. During weekly meetings feedback from members and advisors was collected regarding suggestions for future coalition activities. Additionally, social media analytics were shared on posts from the previous week. Many students were passionate about the impact they were making on campus through the coalition, so lack of participation was not common. Attendance at weekly meetings ranged from 5-20 participants, including students and advisors.

**Figure 1**

*Sample Social Media Post 1*

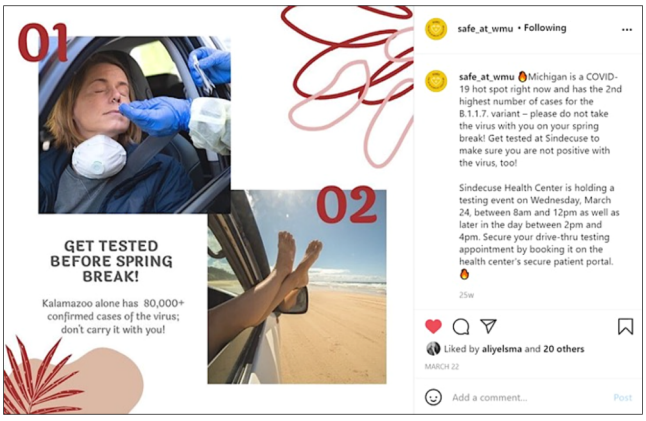



## Coalition Activities

The coalition grew over the Fall 2020 semester as more students noticed the impact it was making on awareness of COVID-19 mitigation issues. Involvement with several departments and the student health center further increased the effectiveness and productivity of the coalition. During this time, coalition activities centered on educating others on health disparities, educating students on healthy practices, dispelling vaccine myths, promoting contact tracing, and sharing university resources. Early fall semester events included sidewalk chalk messaging to encourage mask wearing on campus and the distribution of homemade masks at an in-person student open mic event on campus where over 50 students were in attendance. Social media posts were regularly delivered across the coalition's platforms (see sample posts in Figures 1 and 2). In addition, 12 of the coalition members completed online training to become certified contact tracers and volunteered their time at the student health center to follow up with students who tested positive for COVID-19, reach out to close contacts for quarantining purposes, and share relevant resources and available support options. The connection to the university's student health center, through contact tracing and support from the advisors who worked there, was crucial when making social posts to share about drive-through testing and later vaccination events.

**Figure 2**

*Sample Social Media Post 2*




Information about university-wide initiatives was posted on the coalition's social media accounts, such as the Invisible Needs project (a collection of resources for WMU students to have access to food, menstrual products, textbooks, etc.). A Halloween costume contest on Instagram was a fun, interactive social activity effort during a time of required physical distancing. Infographic flyers were posted around campus with COVID-19 dashboard information, and two videos were produced to share on social media that

encouraged COVID-19 tests before Thanksgiving break and getting vaccinated in early April.

## Coalition Impact

The coalition was recognized through news coverage to highlight how peer influence and student-friendly language were salient pieces to sharing evidence-based COVID-19 content to university students (Flynn, 2020, 2021; Kummer, 2020; McCauley, 2020a, 2020b; Robinson, 2020a, 2020b). The positive impacts of the coalition were recognized by a local news station, university newsletter, and a statewide online news site. In addition, the university's Board of Trustees invited the leadership team of the coalition to speak at one of their meetings in November of 2020 regarding the impact of the CSC on the campus community.

The coalition delivered 418 social media posts from September 17, 2020, to September 18, 2021. These posts received the attention of the campus community and beyond, with over 4,000 "likes" recorded. Of the three social media platforms used by the coalition (Instagram, Facebook, and Twitter), Instagram had the most interactions with 379 followers. Over 1,000 posts were shared by others from the coalition's social media pages, making the coalition a main source of COVID-19 related information used by the campus community. Some of the social media posts received recognition from accounts with a larger following, such as Western Michigan University, the Chief Medical Executive for the State of Michigan, and the Michigan Department of Health and Human Services. As depicted in Table 1, social media reach was evident across all three platforms. In addition, the coalition accounted for staffing 84 contact tracing shifts (168 hours) during the Fall 2020 semester, accounting for 40.3% of all shifts scheduled through the university health center.

**Table 1**

*Social Media Reach and Engagement*

| Reach and Engagement | Instagram | Facebook | Twitter |
|---|---|---|---|
| Followers | 379 | 45 | 61 |
| Posts | 148 | 122 | 130 |
| Story posts | 24 | N/A | N/A |
| Likes | 3,339 | 61 | 929 |
| Shares | 1,076 | 15 | N/A |
| Bookmarks | 135 | N/A | N/A |
| Comments | 24 | 12 | 105 |
| Average views/story | 85 | N/A | N/A |

In Summer 2021, the coalition became institutionalized and partnered with the Office of Health Promotion and Education. This allowed social media content to be shared through various university channels, as the coalition also adopted WMU's approved color palate. The main focus of the coalition at this time was to ensure a safe return to campus for the Fall 2021 semester, especially for incoming freshman students. Once the semester began, the coalition worked to promote and encourage the COVID-19 vaccine through a social media campaign. Posts on social media included the campaign tagline "This is Your Shot" and worked to inform the campus community and beyond regarding the vaccine (see Figure 3). Current plans are that the coalition will continue to maintain relationships with the university and uphold social media posts throughout the Spring 2022 semester. This will allow campus messaging to reach additional individuals and enable education to be more widespread throughout the campus community.

**Figure 3**

*"This is Your Shot" Social Media Post*

## Conclusion

The primary reason for initiating a student-led coalition during the pandemic was for students to connect directly with other students on COVID-19 topics. Students in the CSC were familiar with using peer-friendly language and knew which social media channels were the most popular within the primary audience. A main part of the coalition's success was planning and creating social media content at least one week in advance. In addition, it was helpful for non-seniors to be involved so a continuation of momentum occurred in the coalition into the next academic year. A learning opportunity was the constant change in size of the subcommittees based on student interests changing and members' time commitments being altered during the academic year. Major challenges of the coalition revolved around recruiting students who were not in health-related majors and overcoming virtual burnout. For future coalitions, a recommendation is to have a liaison in the university health center to facilitate communicate regarding policy changes, contact tracing updates, student questions, and more.

Creating and implementing a coalition was an excellent learning opportunity for the ESG members involved and should be a consideration for any chapter interested in making an impact on campus health-related issues.

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