A MULTI-VARIANCE ANALYSIS OF QUALITY OF LIFE DURING THE COVID-19 PANDEMIC IN WESTCHESTER COUNTY, NY

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Acknowledgements

Table of Contents

List of Figures and Tables

1. **Abstract**

Coronavirus (Sars-CoV-2) began in Wuhan, China and has crossed gender, race, and economic lines worldwide. As of November 18, 2020, there have been approximately fifty-five million cases reported worldwide. It is vital to take note of how the population's quality of life changed in response to the severe measures of a county-wide lockdown. Utilizing the World Health Organization's Quality of Life Scale (WHOQOL-BREF) and self-made demographic questionnaire, surveys were administered during and after the mandatory lockdown to participants in the area above the age of 13. The data showed significant improvements in the quality of life in females and participants with associate degrees after the lockdown. Psychological protective factors that many participants implemented into their daily routines did not have a significant impact on their scores before and after the lockdown. As predicted, participants who knew of or lost loved ones and those who followed unestablished news sources did not experience a significant improvement in their quality of life after the lockdown. Using the results, a longitudinal study could be conducted to explore the effects of the pandemic as it continues to change and evolve beyond the initial lockdown in early spring of 2020, especially considering Westchester 's new influx of cases for coronavirus in late fall of 2020.

2. **Review of Literature**

2.1   What Is COVID-19?

An outbreak of novel coronavirus (Sars-CoV-2), which began in Wuhan, China around December, has spread rapidly around the world, with multiple confirmed cases daily. On December 31, 2019, China reported a cluster of cases of pneumonia among people who were associated with the Huanan Seafood Wholesale Market in Wuhan, Hubei Province (Holshue et al. 2020). The Chinese authorities identified the symptoms as novel coronavirus, which became isolated on January 7, 2020 (WHO). This has not been the only coronavirus outbreak that researchers have seen in the past century. In November 2002, the first known case of severe acute respiratory syndrome (SARS) occurred in Foshan, China. Many countries around the world were affected similar to today's circumstances. By July 2003, following a total of 8,096 confirmed cases, no more infections were detected; the SARS pandemic was over. No human SARS cases have been detected since (Wit et al. 2016). Only animal populations were affected with SARS including the bat populations in China. Metagenomic studies identified sequences of closely related SARS-like viruses that were circulating in Chinese bat populations in 2015 that were suspected of posing a future threat (Menachery et al. 2015). The H1N1 influenza pandemic in 2009 is probably one of the most recognizable pandemics in modern history, prior to coronavirus. Similar to Sars-CoV-2, the Influenza A H1N1 (Swine Flu) in early 2009, provided a major challenge to health services

around the world and negatively impacted the public. Pandemics have a tendency to change the way the general public views the world around them. They have led to the stockpiling of goods and certain foods, the victimization of particular population groups, and the cancellation of travel (Goodwin et al. 2009).

Coronavirus knows no boundaries and can affect different populations. All ages are susceptible. The infection is transmitted through large droplets generated during coughing and sneezing by patients who carry the virus (Rothe et al. 2020). Patients could either show symptoms of fever, coughing, shortness of breath, loss of taste or smell along with fatigue (CDC). Patients may also be carrying the virus while being asymptomatic. Asymptomatic patients do not show any of the known signs of carrying the virus which is harder to detect and can help spread the virus to more people, however, a few cases of asymptomatic patients spreading the virus have been recorded.

The World Health Organization has classified the Coronavirus disease as a worldwide pandemic. There are measures that people are recommended to take to avoid spreading the virus and getting it themselves.

2.2   COVID-19 Impacts

The novel coronavirus has had a global impact in a multitude of ways. International travel bans have been enforced affecting over 90% of the world population. Tourism has seen a decline since March 2020. The impacts on air travel, cruises and travel accommodations has devastated many industries. Measures have been taken to lessen the spread of COVID-19 including restrictions put on public gatherings and community mobility (Gössling et al. 2020). The United States had the highest number of daily cases in the world in the spring of 2020. Social distancing policies and shelter-in-place orders have helped improve those numbers (Courtemanche et al. 2020). New York has proven to be the epicenter of the virus in the first few months of the pandemic in the United States. These measures put in place to protect the general public have had impacts on people's social and personal lives.

2.2.1   Pandemic Impacts on Mental Health

The novel coronavirus Sars-CoV-2 has crossed gender, economic, racial, and other backgrounds. The effect has been felt all over the world. One of the most significant impacts the virus has had would be on people's psychological well-being. This is due to the disruption of people's routines, anxieties, the loss of loved ones, and the overall stigma that could be developed in events like this (Chew et al. 2020).

People with pre-existing mental illnesses are especially susceptible to the increase in feeling of depression, anxiety and stress. A few pre-existing mental illnesses that could severely be impacted by the circumstances would be Obsessive-Compulsive Disorder (OCD) patients, Major Depressive Disorder patients, and Generalized Anxiety Disorders patients, to name a few. Obsessive Compulsive Disorder patients, especially those who have constant checking, hoarding and washing compulsions are at a higher

risk. Due to the ongoing lockdown and lingering uncertainty, patients are more likely to resort to panic buying and excessive hoarding of essential items (Qiu et al. 2020). Major Depressive Disorder patients would experience this disruption to their everyday routines which could lead to increased stress levels, which in turn further escalates depressive symptoms. The same case would go for patients suffering from an assortment of anxiety disorders (Chatterjee et al. 2020).

Studies have also shown that even the general public could experience these symptoms with expectations that it will last after the pandemic. Studies conducted on past outbreaks have indicated acute mental health decrements due to the effects of quarantining, lack of clear information, fears of infection, boredom, and frustration (Holingue et al. 2020). The beginning stages of social isolation can be particularly frustrating which could induce feelings of sadness, anger, decrease in self-esteem and cognitive abilities. In addition to that, a prolonged experience of social isolation has also been linked with an increased risk of depression, suicidal thoughts, and early mortality (Baumeister et al. 1995; Holt-Lunstad et al. 2010). People who could be affected would include healthcare professionals, essential workers, those experiencing the loss of a loved one, as well as, children, adolescents, and adults who experienced a disruption in their everyday routines.

Healthcare and essential workers have been on the frontlines during the COVID-19 pandemic meaning that they have been the most exposed demographic. They could experience psychological burden because of the lack of organization, lack of resources, and the increased demand for these workers to be present in their fields even during the pandemic. The lack of resources creates an environment with less adequate care for the lives they are responsible for, who may be suffering or losing their lives. Healthcare workers are usually trained to experience these stressors, but the lack of resources would not only affect their patient's lives but also prohibit them from experiencing a safe environment to work in. Their own health may not be considered by their employers and could lead to a higher chance of disease exposure (Williamson et al. 2020). A study investigated the psychological impact of the COVID-19 outbreak on Italian healthcare workers found that healthcare professionals who worked in COVID-19 specific wards reported higher levels of depressive symptoms and posttraumatic stress symptoms (PTSS) than those who worked in other healthcare units at the time (Di Tella et al. 2020). Other essential workers such as supermarket workers, delivery drivers, and sanitary workers could experience similar fears and anxieties.

Mandatory school closures have impacted students across all age groups. Their education and mental health were put through dramatic. Only 16% of all children in the United States receive any mental health services. Of those who are receiving the care, between 70% to 80% receive that care in a school setting (The Center for Health and Health Care in School). The COVID-19 pandemic may worsen existing mental health problems and lead to more cases among children and adolescents because of the unique combination of the public health crisis, social isolation, and the economic recession (Golberstein

et al. 2020). The domestic lifestyle for many of these children and adolescents also has an impact on their mental health. Not only do these children have to cope with the major changes that are being made to their everyday lives, but their families may struggle to meet their basic physical and emotional needs. Their home-life could involve poverty, child abuse and neglect, partner violence, and parental mental health problems like substance abuse. These circumstances tend to worsen during national crisis like this one (Bartlett et al. 2020). With the mandatory school shutdowns, it is difficult for children to separate their own experiences from those of their families. The impact of COVID-19 affects the whole household, including the children. If parents and siblings are overwhelmed by the crisis, their emotional stress could possibly fuel the child's depression, anxiety, or other mental illnesses (Wagner et al. 2020).

2.2.2 Protective Factors Impacts on Mental Health During Pandemic

A protective factor is something that helps to prevent problems. A risk factor is something that helps to create problems. There are many risk factors involved with the COVID-19 pandemic including being under quarantine, losing a loved one due to COVID-19, unemployment, financial hardships, and other lockdown measures (Rossi et al. 2020). These risk factors play a role in the general population's mental health. In order to minimize these risk factors, there are protective measures that could be taken to reduce the risk. Some positive protective factors that could be utilized would include conducting internal reflections, exercising, meditation, positive thinking or positive reinforcement, and maintaining positive social relations with family and friends (Layous et al. 2014).

2.2.3 Social Media Impacts on General Public's View on Pandemic

Younger generations have become more reliant on social media for their information and entertainment than past generations. Roughly three-quarters of the general public in America (73%) use more than one social media platforms (M=3) (Pew Research Center). There has been a growing divide between social and traditional media. In the 2009 H1N1 flu pandemic, a study showed that organizations were more heavily reliant on traditional media when framing the pandemic as a general crisis. This may be because at the time of the study, organizations were just beginning to develop formal policies for how to use social media (Liu et al. 2011). In 2019, it was reported that around 53.6% of the global population (4.1 billion people), use the internet (The International Telecommunication). The use of social media is more common due to the fast and effective platforms it offers for searching, sharing, and distributing information. Despite the importance of rapid access to information during these uncertain times, poor, inaccurate, or false information could lead to misunderstanding, which ultimately makes the situation worse. Medical professionals have started to utilize social media to spread accurate information and have a closer connection to their patients. Medical or health-related information posted by anonymous accounts should not be trusted due to the lack of certification. Dissemination of misinformation about health could

lead to unnecessary outcomes such as fear, anxiety, misunderstanding of the disease, and problems in patient-doctor relationships (Sahni et al. 2020). A significant amount of misinformation has been spread about the COVID-19 pandemic and much of it was spread through social media networks

The CDC's guidelines that have been put in place for the safety of the community has posed challenges for many individuals. With schools, offices, and businesses closing, and the recommended social distancing that has been put in place, the social interactions people used to experience are no longer available. During the pandemic, there is not much to do, however, modern day social media sites give the public a source on not only knowledge but entertainment as well. It is currently being used for fostering active learning, community building and civic participation (Greenhow et al. 2020). The most prevalent communities where social media and technology are being used are in learning communities (K-12 and college). There are benefits to social media being used in classrooms. One major benefit is that students are able to enjoy a productive learning environment from the comfort of their own homes. According to reports from study conducted in China, students have more control over their studies and have more opportunities at their disposal for reflection (Demuyakor et al. 2020). Many successful online learners adapt to their environment and learn to prioritize and organize their workloads. The beginning of quarantine consisted of chaos and confusion because there were no set procedures on how to effectively continue instruction. Fall 2020 districts were given guidelines to follow for reopening. In New York State, The Board of Regents and Department's task was to guide schools and districts with the flexibility they will need to develop and implement creative solutions to their unique, local circumstances (New York State Education Department).

2.2.4   Pandemic Impacts on Living Conditions

Coronavirus knows no boundaries and can affect all ages, backgrounds, and communities. The pandemic has disproportionately affected racial/ethnic minority groups especially African American, LatinX, and Native American communities. Many inequities that exist put racial and ethnic minority groups at a higher risk of infection and dying from COVID-19. People from some racial and ethnic minority groups are more likely to be uninsured than non-Hispanic whites (CDC). America's current economic crisis has led to unemployment rates of 6.9% as of November 6, 2020 (Bureau of Labor Statistics). A majority of employees rely on their employer-sponsored coverage meaning that many of these employees no longer have jobs or health insurance during a pandemic. People from some racial and ethnic minority groups in America are disproportionately represented in essential work settings such as healthcare facilities, factories, grocery stores, and public transportation. On top of that, some people from racial and ethnic groups live in crowded conditions (urban areas) that make it more difficult for them to follow the guidelines put in place to keep them safe. Due to the increase in unemployment rates, there is a possibility many of these families could be evicted from their homes and face possible homelessness

(CDC). American minority groups in these areas are at a higher risk of exposure to the virus due to their occupation and their environments.

2.3   Purpose of Research

The specific aim for this research topic is to discover how the pandemic is affecting quality of life. It is hypothesized that people who do not demonstrate protective factors, have inaccurate sources of information, or are within a lower age bracket will score lower on the WHOQOL-BREF scale during the pandemic than those who demonstrate protective factors, receiving data from official sources, or are within an older age bracket. A similar outcome would be expected that those who have a relationship with those affected by the virus will score lower on the WHOQOL-BREF scale in comparison to those who have no relationship with those affected by the virus. This research topic is very relevant during this time because there is much uncertainty, not only on how to treat the virus, but also how people's lives have been affected.

3. Methods

The surveys sent out included an original demographic questionnaire along with a 26-question questionnaire create by the World Health Organization. Aside from an additional question regarding participation in a follow up survey, both surveys were identical and administered through the school district office to all parents, students, and teachers in the school system. All participants were required to be 13 or older and all identities remained anonymous.

3.1   Privacy Measures Taken

Consent forms were mandated for participants to sign with the addition of a signature from a parent or guardian if the participant was under the age of 18. All the information being collected remained anonymous. The administrators from the school district sent out the emails; the researchers have no access to that information. There was no place for a participant to write their names or any information that compromises their identity. The first round of responses was taken on April 23, 2020 and the follow up round was taken on October 14, 2020.

3.2   Surveys

Both surveys were administered through the school board to be sent out to both the parents and students over the age of thirteen to complete the survey, requesting for participants. If the individual was interested, they were asked to complete a consent form, a demographic questionnaire, and a baseline WHOQOL-BREF baseline. The WHOQOL-BREF scale originated from the WHOQOL-100 as shortened version of the originally much longer document. The intention of the quality of life scale was to create a holistic measure of an individual's quality of life through a self-reported questionnaire. The WHOQOL-

BREF scale has been split into four domains: physical health, psychological, social relations, and environment. 24 questions on the scale are categorized into these four domains. All questions in the WHOQOL-BREF are graded on a scale of 1 to 5. All four of the domain scores were calculated using through the multiplication of the mean domain score by a factor. (Gobbens et al., 2020)

The questions administered were identical in both surveys. However, the first survey included a question asking if the individual would be interested in further participation by filling out the second survey while the second survey did not include this inquiry.

After filling in the consent for, participants were asked to complete a demographic questionnaire to gather information on the participants' background. Questions were asked about gender, age, education or employment, race, income, marital status, sources of information, family members diagnosed with COVID-19, use and benefit of internal reflection, exercise, meditation, positive thinking, and maintaining social relationships. Participant names remained anonymous and no identification was traced to any participants' information.

The final steps included filling in the 26-question questionnaire for the WHOQOL-BREF scale. All questions were required to filled out otherwise their information was not considered in the data analysis process. Questions were not altered in any way before the administration of the survey and participants were given the option to give a neutral answer in the case that the participant was not fully comfortable with giving their answer.

3.3   *Participants*

All participants were required to be over the age of 13. If a participant was over the age of 13, but was still under the age of 18, a parent or guardian signature was still required. Only those connected to the school district were contacted to be in the survey meaning that there were no participants outside of the local area in the survey. Survey responses were only removed from the statistical analysis if there they returned an incomplete response. There were 89 completed responses for the first round and 105 completed for the second round.

3.4.   *Statistical Analysis*

All analyses were performed using Microsoft Excel version 16.39, using the function MANOVA for calculating correlations between a participant's demographic to their WHOQOL-BREF scale in both distributions of the questionnaire to the public. These correlations were then put against the official WHOQOL-BREF transformed scale.

Demographics were analyzed and reported as individual categories. Gender was recoded into three variables with categories representing female, male, and other. Age was recoded into eight variables with ranges representing, ages 13-18, 19-22, 23-29, 30-39, 40-49, 50-59, 60-64, and 65 or older.

Education was recoded into five variables with categories representing not finishing high school, having a high school diploma or GED, an associate degree, a bachelor's degree, and a graduate degree. Race was recoded into seven variables representing people from backgrounds including White, Black, Hispanic, Asian, Native, one representing other, and not applicable.

Employment was recoded into five variables including full-time employment, part-time employment, unemployment, full-time student and people not in the labor force at the moment. Income was recoded into five variables with ranges of less than 50,000 dollars, 50,000 to 100,000, 100,000 to 200,000, more than 200,000, and an option of uncertainty in income. Marital status was recoded into four variables containing single or never married, married, divorced, and widowed. Sources that people were being informed by were recoded into five variables representing social media, news outlets, newspapers, CDC government run websites, and other sources not listed. Relations to those diagnosed with COVID-19 was recoded into three variables representing having a relation to an individual that has been diagnosed, having no relation to an individual that has been diagnosed, and having a preference to not answer.

Use of internal reflection was recoded into three variables with categories representing the use of internal reflection, no use of internal reflection, and a preference to not answer. The same process was used to recode the use of additional exercise, meditation, positive thinking and the continuation of social relations

Twenty-three one-way multi-variance analysis (MANOVA) tests were completed to analyze the correlation between the participants quality of life and their demographic questionnaire background for both administrations of questions. One-way MANOVA tests allowed the use of measuring each of the demographic variables against the individual's four domain scores, general health, and overall quality of life. This process was completed again for the second survey. A pivot table was created to further analyze the results.

3.4   *Second Round of Administration*

The follow-up was originally intended to be sent out once society returned back into its usual "norm". However, it been more recently predicted that this return will be a much further reach than originally expected. Estimates in the early months of this pandemic predicted that society would return to some state of normalcy by the new academic year in September 2020. In October 2020, estimations believe that a vaccine will be available to the public by the middle of next year therefore allowing people to return to their lives before COVID-19 had spread.

In order to complete the study in a timely fashion, the second round had been administered in the early months of fall in 2020. This was done after the county had started moving in later phases of reopening while also being done before a possible influx of cases with flu season fast approaching.

4. Results

Out of the 105 participants in our first survey, 89 of those participants were used in analysis. Out of the 129 participants in our second survey, 105 of those participants were used in analysis. Those who did not fully complete the survey were excluded from data analysis. The completion rate was 88% for both surveys.

Each participant's response was considered in six different scores. These scores were based on their answers to questions regarding general health, overall health, physical health, and on the participants' physical health, psychological health, social relationships, and environment.

There were four domains that were being analyzed which included questions regarding: activities of daily life, dependency on medical substances, energy and fatigue levels, mobility, pain and discomfort, sleep and rest, and work capacity were all categorized under physical health facets (Domain 1); bodily image and appearances, negative and positive emotions, self-esteem, spirituality or religion, thinking, learning, memory, and concentration were all categorized under psychological health facets (Domain 2); personal relationships, social support, and sexual activity were categorized under social relation facets (Domain 3); financial resources, freedom, physical safety and security, accessibility and quality of health and social care, home environment, opportunities to acquiring new skills or information, participation in recreational activities, physical environment, and transportation were all categorized under environmental facets (Domain 4). Two questions in the WHOQOL-BREF were categorized as general health. In both rounds of data collection, a one-way multivariate analysis of variance (MANOVA) was used to test for a significance between each demographic category and note any differences in the quality of life between each variable. The correlations deemed significant had significance levels below $p = 0.01$.

Table 1: p-scores of demographic categories using MANOVA, red highlight p = 0.05 green highlight p = 0.10

| | | During Lockdown | | | | | | After Lockdown | | | | | |
| | | F | F | F | p-value | p-value | p-value | F | F | F | p-value | p-value | p-value |
		Pillai	Wilk's	Hotelling	Pillai	Wilk's	Hotelling	Pillai	Wilk's	Hotelling	Pillai	Wilk's	Hotelling
1	SEX	1.62	1.68	1.74	9.05%	7.51%	6.24%	1.18	1.17	1.17	29.67%	30.31%	30.97%
2	AGE	1.15	1.18	1.22	27.63%	23.95%	20.50%	1.28	1.31	1.33	14.75%	13.20%	11.71%
3	SCHOOL	1.89	1.90	1.89	0.76%	0.79%	0.81%	2.60	2.67	2.70	0.01%	0.01%	0.00%
4	RACE	0.94	0.94	0.94	56.83%	57.12%	57.48%	1.70	1.78	1.83	1.22%	0.80%	0.52%
5	EMPLOY	1.21	1.23	1.24	22.77%	21.72%	20.73%	0.68	0.67	0.67	87.36%	87.74%	88.12%
6	INCOME	1.45	1.43	1.41	10.73%	11.65%	12.64%	1.15	1.18	1.21	28.61%	25.80%	23.10%
7	STATUS	1.72	1.78	1.84	6.63%	5.51%	4.59%	1.70	1.75	1.79	3.88%	3.14%	2.53%
8	SM1	2.21	2.21	2.21	5.01%	5.01%	5.01%	2.04	2.04	2.04	6.67%	6.67%	6.67%
9	SM2	0.62	0.62	0.62	71.31%	71.31%	71.31%	1.37	1.37	1.37	23.21%	23.21%	23.21%
10	SM3	1.04	1.04	1.04	40.25%	40.25%	40.25%	0.65	0.65	0.65	69.13%	69.13%	69.13%
11	SM4	1.43	1.43	1.43	21.45%	21.45%	21.45%	1.42	1.42	1.42	21.56%	21.56%	21.56%
12	SM5	0.96	0.96	0.96	45.52%	45.52%	45.52%	0.32	0.32	0.32	92.35%	92.35%	92.35%
13	DIAGNOSED	0.97	0.96	0.96	48.36%	48.61%	48.88%	1.86	1.86	1.86	9.52%	9.52%	9.52%
14	REFLECT	0.74	0.74	0.74	70.95%	71.17%	71.41%	2.45	2.45	2.45	2.94%	2.94%	2.94%
15	REFLECT FUP	2.38	2.40	2.43	0.75%	0.69%	0.63%	2.46	2.46	2.47	0.51%	0.50%	0.48%
16	EXERCISE	1.78	1.78	1.78	11.26%	11.26%	11.26%	0.66	0.66	0.66	68.09%	68.09%	68.09%
17	EXERCISE FUP	1.24	1.23	1.23	26.13%	26.44%	26.76%	1.05	1.04	1.04	40.69%	41.13%	41.59%
18	MEDITATE	0.47	0.46	0.46	93.09%	93.37%	93.65%	0.90	0.90	0.90	54.57%	54.80%	55.05%
19	MEDITATE FUP	0.79	0.79	0.79	65.73%	66.03%	66.35%	1.32	1.33	1.35	20.77%	20.07%	19.41%
20	+THINK	0.36	0.36	0.36	97.50%	97.58%	97.65%	2.50	2.51	2.52	0.43%	0.42%	0.41%
21	+THINK FUP	0.34	0.34	0.34	97.98%	98.02%	98.07%	1.21	1.21	1.20	27.64%	28.11%	28.59%
22	SOCIAL	2.79	2.94	3.09	0.17%	0.10%	0.06%	0.66	0.65	0.65	79.16%	79.58%	80.01%
23	SOCIAL FUP	2.25	2.31	2.36	1.15%	0.95%	0.79%	0.62	0.62	0.61	82.54%	82.81%	83.09%

Differences within a demographic category are seen in six different points in the data (Table 1). Notable differences between each variable in their own categories were found in educational background for both during and after lockdown, ethnicity for after lockdown, marital or relationship status after lockdown, use of internal reflection after lockdown, and use of positive thinking after lockdown.

In both rounds of data collection, a pivot table was used to test for a significance for each variable within the categories. The correlations deemed significant had significance levels that had a majority of the scores below p = 0.05.

Table 2a: p-scores of basic demographic categories using a pivot table red highlight p = 0.05 green highlight p = 0.10

QUESTION	ANSWER	During Lockdown							After Lockdown							P-Value of Difference in Means (Absolute Value)					
		%	Count	Overall QOL	Domain 1	Domain 2	Domain 3	Domain 4	General Health	%	Count	Overall QOL	Domain 1	Domain 2	Domain 3	Domain 4	General Health	Overall QOL	Domain 1	Domain 2	Domain 3	Domain 4	General Health
ALL	ALL	100%	90	17.60	16.41	14.89	14.64	17.02	16.00	100%	114	18.00	16.75	15.27	15.65	17.32	16.88	3.85%	4.76%	4.56%	0.00%	6.10%	0.03%
SEX	1	61%	55	17.67	16.19	14.51	14.57	16.66	15.85	80%	91	17.93	16.62	15.15	15.74	17.18	16.79	16.50%	4.26%	1.01%	0.00%	1.75%	0.12%
SEX	2	38%	34	17.53	16.82	15.63	14.82	17.74	16.24	19%	22	18.36	17.30	15.94	15.52	17.89	17.45	3.76%	10.16%	22.56%	7.15%	32.58%	1.00%
SEX	3	1%	1	16.00	14.29	10.67	12.00	12.00	16.00	1%	1	16.00	16.00	11.33	10.67	18.00	12.00	NA	NA	NA	NA	NA	NA
AGE	1	42%	38	17.05	16.15	14.16	14.07	17.41	16.00	29%	33	17.45	16.14	13.88	14.67	17.42	15.76	15.59%	48.65%	25.07%	7.08%	48.04%	30.66%
AGE	4	2%	2	14.00	15.43	14.67	12.00	15.50	14.00	1%	1	20.00	20.00	17.33	18.67	17.00	16.00	NA	NA	NA	NA	NA	NA
AGE	5	27%	24	18.67	16.69	15.36	15.22	16.56	16.33	25%	28	18.43	16.71	15.57	16.19	16.95	17.00	27.92%	47.72%	31.06%	1.83%	17.78%	7.60%
AGE	6	21%	19	17.68	16.60	15.47	14.81	17.05	15.79	38%	43	17.86	17.00	15.71	15.60	17.37	17.30	34.64%	15.47%	26.78%	4.70%	18.90%	0.07%
AGE	7	7%	6	18.00	16.48	15.78	16.67	16.75	16.00	3%	3	18.67	17.14	17.11	16.89	18.00	17.33	27.37%	23.05%	7.54%	42.70%	12.80%	16.08%
AGE	8	1%	1	16.00	17.14	15.33	12.00	17.00	16.00	5%	6	19.33	17.71	17.11	17.78	17.83	19.33	NA	NA	NA	NA	NA	NA
SCHOOL	1	34%	31	17.29	16.06	14.11	14.15	17.55	16.26	29%	33	17.45	16.14	13.88	14.67	17.42	15.76	33.30%	41.17%	30.27%	11.37%	36.04%	15.81%
SCHOOL	2	10%	9	16.00	16.89	14.59	13.63	16.89	15.56	1%	1	8.00	15.43	13.33	8.00	13.50	12.00	NA	NA	NA	NA	NA	NA
SCHOOL	3	3%	3	17.33	13.90	13.33	12.89	14.33	14.67	2%	2	20.00	19.43	18.00	18.00	18.75	18.00	5.00%	0.75%	2.14%	3.92%	1.78%	5.17%
SCHOOL	4	16%	14	18.86	16.82	15.05	15.05	17.14	15.14	25%	28	18.29	17.16	15.69	15.86	17.91	17.86	12.94%	19.95%	9.00%	6.98%	4.17%	0.00%
SCHOOL	5	37%	33	17.82	16.66	15.78	15.35	16.74	16.36	44%	50	18.32	16.83	15.88	16.24	16.94	17.12	6.31%	29.65%	36.90%	0.78%	26.04%	1.87%
RACE	WHITE	73%	66	17.82	16.53	14.83	14.59	17.31	16.18	68%	78	18.26	16.95	15.53	15.74	17.59	17.13	5.27%	4.39%	0.44%	0.01%	11.28%	0.12%
RACE	ASIAN	19%	17	17.18	16.30	15.22	14.90	16.32	15.53	24%	27	17.04	16.02	14.72	15.56	16.30	16.59	38.90%	24.76%	14.41%	8.06%	47.34%	2.14%
RACE	BLACK	1%	1	16.00	12.00	13.33	16.00	11.50	16.00	1%	1	20.00	19.43	15.33	14.67	18.50	16.00	NA	NA	NA	NA	NA	NA
RACE	HISPANIC	2%	2	16.00	16.57	15.67	12.67	16.00	18.00	1%	1	20.00	19.43	19.33	18.67	20.00	16.00	NA	NA	NA	NA	NA	NA
RACE	NATIVE	2%	2	16.00	14.29	12.67	14.67	16.75	12.00	1%	1	20.00	13.14	6.67	8.00	17.50	8.00	NA	NA	NA	NA	NA	NA
RACE	OTHER	1%	1	20.00	16.57	15.33	14.67	16.00	16.00	0%	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RACE	NA	1%	1	16.00	18.29	17.33	16.00	18.50	16.00	5%	6	18.00	17.14	15.11	15.78	17.75	16.67	NA	NA	NA	NA	NA	NA
EMPLOYMET	1	34%	31	17.94	16.72	15.40	15.10	16.85	15.74	25%	29	18.21	16.93	15.86	15.72	17.07	17.24	24.49%	29.48%	10.55%	7.62%	26.90%	0.10%
EMPLOYMET	2	11%	10	16.80	16.57	14.87	14.00	16.30	15.20	23%	26	18.00	16.81	15.18	16.00	17.42	17.23	3.60%	33.05%	29.83%	0.16%	1.89%	0.11%
EMPLOYMET	3	11%	10	18.00	16.86	15.87	16.00	17.55	16.80	23%	26	17.85	17.03	15.72	15.79	17.38	16.92	40.62%	35.07%	39.33%	37.47%	37.68%	41.55%
EMPLOYMET	4	4%	4	19.00	15.43	15.83	15.67	15.88	17.00	3%	3	18.67	16.38	15.33	16.44	17.83	18.67	38.83%	22.55%	35.01%	29.53%	8.14%	9.73%
EMPLOYMET	5	39%	35	17.26	16.07	14.06	13.90	17.34	16.11	26%	30	17.87	16.30	14.38	15.07	17.37	16.00	5.16%	25.80%	22.91%	0.38%	47.28%	40.78%
INCOME	1	0%	0	NA	NA	NA	NA	NA	NA	1%	1	16.00	14.86	11.33	14.67	13.50	16.00	NA	NA	NA	NA	NA	NA
INCOME	2	4%	4	17.00	16.43	14.17	12.33	14.75	16.00	4%	4	17.00	16.71	15.17	16.00	15.13	16.00	50.00%	39.67%	16.87%	1.21%	33.85%	NA
INCOME	3	20%	18	18.44	16.79	15.93	15.19	17.00	16.00	11%	12	17.00	16.19	14.94	15.44	17.08	16.33	0.70%	12.14%	4.71%	34.57%	43.94%	27.80%
INCOME	4	50%	45	17.96	16.37	14.64	14.67	17.33	16.44	56%	64	18.38	17.05	15.64	15.81	17.68	17.00	8.08%	0.86%	0.08%	0.04%	8.57%	6.13%
INCOME	5	26%	23	16.35	16.17	14.70	14.55	16.80	15.13	29%	33	17.82	16.42	14.81	15.39	17.09	16.97	0.11%	27.15%	40.01%	3.33%	23.35%	0.04%
STATUS	1	44%	40	17.10	16.14	14.25	14.03	17.38	16.10	30%	34	17.41	16.10	13.86	14.55	17.37	15.65	21.02%	45.12%	17.05%	9.93%	49.11%	16.71%
STATUS	2	51%	46	18.00	16.65	15.46	15.16	16.84	15.91	64%	73	18.14	16.98	15.84	16.15	17.37	17.37	32.12%	10.78%	7.41%	0.11%	1.95%	0.00%
STATUS	3	4%	4	18.00	16.29	14.67	14.67	15.50	16.00	5%	6	19.33	17.52	16.33	15.78	16.67	18.00	8.55%	11.17%	8.34%	17.14%	13.55%	1.47%
STATUS	4	0%	0	NA	NA	NA	NA	NA	NA	1%	1	20.00	17.14	14.67	16.00	16.00	16.00	NA	NA	NA	NA	NA	NA

Table 2b: p-scores of COVID-19 specific demographic categories using a pivot table red highlight p = 0.05 green highlight p = 0.10

QUESTION	ANSWER	During Lockdown							After Lockdown							P-Value of Difference in Means (Absolute Value)					
		%	Count	Overall QOL	Domain 1	Domain 2	Domain 3	Domain 4	General Health	%	Count	Overall QOL	Domain 1	Domain 2	Domain 3	Domain 4	General Health	Overall QOL	Domain 1	Domain 2	Domain 3	Domain 4	General Health
ALL	ALL	100%	90	17.60	16.41	14.89	14.64	17.02	16.00	100%	114	18.00	16.75	15.27	15.65	17.32	16.88	3.85%	4.76%	4.56%	0.00%	6.10%	0.03%
SM1	0	50%	45	18.22	16.77	15.63	15.50	17.17	16.36	55%	63	18.29	17.22	16.02	16.19	17.52	17.33	41.23%	4.79%	8.03%	1.38%	8.62%	0.09%
SM1	1	50%	45	16.98	16.04	14.15	13.78	16.87	15.64	45%	51	17.65	16.16	14.34	14.98	17.07	16.31	2.82%	34.75%	28.75%	0.06%	24.71%	5.04%
SM2	0	20%	18	16.67	16.22	14.48	14.37	16.89	15.11	29%	33	17.45	16.45	15.13	14.91	17.05	16.12	7.28%	30.12%	7.75%	13.43%	34.93%	3.17%
SM2	1	80%	72	17.83	16.45	14.99	14.70	17.05	16.22	71%	81	18.22	16.87	15.33	15.95	17.43	17.19	5.40%	3.72%	10.05%	0.00%	4.55%	0.05%
SM3	0	44%	40	17.20	16.21	14.95	14.87	16.75	15.30	35%	40	17.70	16.80	15.13	15.40	17.20	16.30	9.47%	4.36%	30.89%	8.42%	8.24%	1.18%
SM3	1	56%	50	17.92	16.56	14.84	14.45	17.23	16.56	65%	74	18.16	16.72	15.34	15.78	17.39	17.19	19.30%	26.77%	4.06%	0.00%	26.41%	2.08%
SM4	0	53%	48	17.50	16.68	14.90	14.81	17.42	16.25	46%	52	17.77	17.09	15.51	15.74	17.57	16.92	21.83%	7.63%	3.44%	0.37%	29.14%	3.40%
SM4	1	47%	42	17.71	16.10	14.87	14.44	16.56	15.71	54%	62	18.19	16.46	15.06	15.57	17.11	16.84	4.98%	10.53%	26.46%	0.06%	2.46%	0.10%
SM5	0	86%	77	17.45	16.30	14.74	14.35	16.92	15.95	85%	97	17.98	16.68	15.15	15.52	17.30	16.87	1.69%	4.21%	4.79%	0.00%	4.12%	0.05%
SM5	1	14%	13	18.46	17.05	15.79	16.31	17.58	16.31	15%	17	18.12	17.14	15.96	16.39	17.44	16.94	27.14%	43.58%	37.36%	44.33%	37.86%	17.23%
DIAGNOSED	1	11%	10	18.00	17.26	14.73	15.87	17.70	16.40	15%	17	18.59	16.71	15.22	14.90	18.12	17.18	16.88%	16.93%	25.54%	9.03%	16.73%	12.84%
DIAGNOSED	2	88%	79	17.57	16.27	14.88	14.46	16.91	15.95	85%	97	17.90	16.75	15.28	15.78	17.18	16.82	9.07%	1.48%	4.48%	0.00%	10.53%	0.09%
DIAGNOSED	3	1%	1	16.00	18.29	17.33	16.00	18.50	16.00	0%	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 2c: p-scores of protective factor categories using a pivot table red highlight p = 0.05 green highlight p = 0.10

		During Lockdown								After Lockdown								P-Value of Difference in Means (Absolute Value)					
QUESTION	ANSWER	%	Count	Overall QOL	Domain 1	Domain 2	Domain 3	Domain 4	General Health	%	Count	Overall QOL	Domain 1	Domain 2	Domain 3	Domain 4	General Health	Overall QOL	Domain 1	Domain 2	Domain 3	Domain 4	General Health
ALL	ALL	100%	90	17.60	16.41	14.89	14.64	17.02	16.00	100%	114	18.00	16.75	15.27	15.65	17.32	16.88	3.85%	4.76%	4.56%	0.00%	6.10%	0.03%
REFLECTION	1	67%	60	17.53	16.17	14.71	14.71	16.68	15.73	60%	68	17.71	16.18	14.75	15.14	17.00	16.59	28.15%	47.93%	43.76%	7.81%	10.22%	0.41%
REFLECTION	2	32%	29	17.79	16.83	15.17	14.44	17.66	16.55	40%	46	18.43	17.58	16.03	16.41	17.79	17.30	2.96%	1.01%	1.28%	0.00%	32.98%	4.07%
REFLECTION	3	1%	1	16.00	18.29	17.33	16.00	18.50	16.00	0%	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
REFLECTION FUP	0	34%	31	17.68	16.68	15.20	14.54	17.71	16.26	40%	46	18.43	17.58	16.03	16.41	17.79	17.30	1.18%	0.31%	1.38%	0.00%	39.22%	0.79%
REFLECTION FUP	1	59%	53	17.74	16.36	15.04	14.72	16.62	16.15	54%	61	17.90	16.39	15.09	15.32	17.04	16.92	29.13%	44.38%	43.19%	3.01%	5.65%	0.76%
REFLECTION FUP	2	7%	6	16.00	15.43	11.89	14.44	16.92	13.33	6%	7	16.00	14.37	11.81	13.52	16.64	13.71	50.00%	12.50%	46.23%	14.94%	37.35%	38.49%
EXERCISE	1	71%	64	18.00	16.60	15.26	14.69	17.23	16.44	63%	72	18.00	16.59	15.16	15.46	17.18	16.94	50.00%	48.20%	34.35%	0.38%	42.38%	3.62%
EXERCISE	2	29%	26	16.62	15.93	13.97	14.51	16.50	14.92	37%	42	18.00	17.02	15.46	15.97	17.56	16.76	0.08%	0.25%	0.05%	0.07%	0.14%	0.03%
EXERCISE FUP	0	29%	26	16.62	15.93	13.97	14.51	16.50	14.92	37%	42	18.00	17.02	15.46	15.97	17.56	16.76	0.08%	0.25%	0.05%	0.07%	0.14%	0.03%
EXERCISE FUP	1	70%	63	17.97	16.62	15.27	14.69	17.18	16.44	61%	70	18.00	16.61	15.26	15.50	17.14	16.97	45.26%	49.26%	48.02%	0.28%	43.49%	3.30%
EXERCISE FUP	2	1%	1	20.00	15.43	14.67	14.67	20.00	16.00	2%	2	18.00	15.71	11.67	14.00	18.50	16.00	NA	NA	NA	NA	NA	NA
MEDITATION	1	23%	21	17.90	16.57	15.11	14.79	17.07	15.43	28%	32	17.50	16.16	15.13	15.46	16.81	16.25	19.06%	14.86%	48.74%	7.94%	25.09%	4.23%
MEDITATION	2	76%	68	17.53	16.33	14.78	14.57	16.98	16.18	71%	81	18.17	16.94	15.28	15.67	17.49	17.09	0.73%	0.57%	3.16%	0.01%	1.36%	0.15%
MEDITATION	3	1%	1	16.00	18.29	17.33	16.00	18.50	16.00	1%	1	20.00	20.00	19.33	20.00	20.00	20.00	NA	NA	NA	NA	NA	NA
MEDITATION FUP	0	78%	70	17.49	16.29	14.75	14.57	16.97	16.06	72%	82	18.20	16.98	15.33	15.72	17.52	17.12	0.32%	0.24%	1.50%	0.00%	0.84%	0.03%
MEDITATION FUP	1	21%	19	18.11	16.66	15.37	14.88	17.05	15.58	26%	30	17.47	16.15	15.29	15.60	16.68	16.27	9.61%	10.16%	42.99%	7.35%	17.85%	7.53%
MEDITATION FUP	2	1%	1	16.00	19.43	15.33	14.67	19.50	20.00	2%	2	18.00	16.29	12.67	13.33	18.75	16.00	NA	NA	NA	NA	NA	NA
+THINKING	1	78%	70	17.66	16.42	14.80	14.57	16.96	16.11	82%	94	17.79	16.77	15.33	15.72	17.21	16.77	29.91%	6.14%	1.62%	0.00%	12.08%	1.00%
+THINKING	2	21%	19	17.47	16.27	15.09	14.81	17.16	15.58	16%	18	18.89	17.05	15.07	15.19	18.11	17.33	0.78%	5.70%	49.07%	26.76%	2.33%	0.53%
+THINKING	3	1%	1	16.00	18.29	17.33	16.00	18.50	16.00	2%	2	20.00	13.14	14.33	16.67	15.25	18.00	NA	NA	NA	NA	NA	NA
+THINKING FUP	0	22%	20	17.40	16.37	15.20	14.87	17.23	15.60	18%	20	19.00	16.66	15.00	15.33	17.83	17.40	0.21%	27.55%	35.91%	20.95%	9.41%	0.28%
+THINKING FUP	1	77%	69	17.68	16.43	14.78	14.55	16.95	16.12	78%	89	17.84	16.87	15.46	15.81	17.26	16.90	25.89%	2.64%	0.33%	0.00%	7.85%	0.30%
+THINKING FUP	2	1%	1	16.00	15.43	16.00	16.00	17.50	16.00	4%	5	16.80	14.86	12.93	14.13	16.30	14.40	NA	NA	NA	NA	NA	NA
SOCIAL	1	97%	87	17.61	16.39	14.90	14.84	17.01	16.09	96%	110	18.00	16.71	15.27	15.68	17.35	16.91	4.53%	6.33%	5.32%	0.03%	4.56%	0.09%
SOCIAL	2	2%	2	16.00	16.00	13.00	9.33	15.75	14.00	3%	3	18.67	18.48	16.22	15.56	16.83	17.33	5.00%	6.70%	4.17%	0.72%	11.55%	5.17%
SOCIAL	3	1%	1	20.00	18.29	18.00	8.00	20.00	12.00	1%	1	16.00	15.43	12.67	12.00	15.50	12.00	NA	NA	NA	NA	NA	NA
SOCIAL FUP	0	3%	3	17.33	16.76	14.67	8.89	17.17	13.33	4%	4	18.00	17.71	15.33	14.67	16.50	16.00	29.53%	21.02%	30.84%	0.20%	25.62%	4.74%
SOCIAL FUP	1	96%	86	17.58	16.41	14.90	14.84	16.98	16.09	96%	109	17.98	16.72	15.28	15.68	17.35	16.92	4.25%	6.43%	5.04%	0.03%	3.25%	0.09%
SOCIAL FUP	2	1%	1	20.00	15.43	14.67	14.67	20.00	16.00	1%	1	20.00	15.43	14.00	16.00	17.50	16.00	NA	NA	NA	NA	NA	NA

Differences within a demographic category are seen in six different points in the data (Table 2). Notable differences for each variable within a multitude of categories. Females (Sex, Answer 1) had significant differences for their domain 1(p=4.26%), domain 2 (p=1.01%), domain 3 (p=0.00%), domain 4 (p=1.75%), and their general health (p=0.12%) scores during and after the lockdown. Those with an associate degree (Education, Answer 3) had significant differences for their overall health (p=5.00%), domain 1(p=0.75%), domain 2 (p=2.14), domain 3 (p=3.92%), and domain 4 (p=1.78%) scores during and after the lockdown. Those of European descent (Race, White) had significant differences for their domain 1 (p=4.39%), domain 2 (p=0.44%), domain 3 (p=0.00%), and general health (p=0.12%) scores during and after the lockdown. Those who had an income of more than two hundred thousand dollars (Income, Answer 4) had significant differences for their domain 1 (p=0.86%), domain 2 (p=0.08%), and domain 3 (p=0.04%) scores during and after the lockdown (Table 2a). Those who received information about the virus from news outlets (SM2, Answer 1) had significant differences for their domain 1(p=3.73%), domain 3 (p=0.00%), domain 4 (p=4.55%), general health (p=0.05% scores during and after the lockdown. Those who did not received information about the virus from sources outside of social media, new outlets, newspapers, or government run websites (SM5, Answer 0) had significant differences for their overall health (p=1.69%), domain 1 (p=4.21%), domain 2 (p=4.79%), domain 3 (p=0.00%), domain 4 (p=4.12%), and general health (p=0.05%) scores during and after the lockdown. Those who did not have any relation to those diagnosed with COVID-19 (Diagnosed, Answer 2) had a significant difference for their domain 1 (p=1.48%), domain 2 (p=4.48%), domain 3 (p=0.00%), and general health (p=0.09%) scores during and after the lockdown (Table 2b). Those who didn't use do any (Reflection, Exercise, and Meditation Answer 2) internal reflection, exercise, or meditation had a significant

difference for their overall health (p=2.96%, 0.08%, 0.73%), domain 1 (p=1.01%, 0.25%, 0.57%), domain 2 (p=1.28%, 0.05%, 3.16%), domain 3 (p=0.00%, 0.07%, 0.01%), domain 4 (p=N/A, 0.14%, 1.36% and general health (p=4.07%, 0.03%, 0.15%)scores during and after the lockdown respective (Table 2c).

As predicted, those receiving information from official sources like the news received higher WHOQOL-BREF scores after the lockdown had been lifted.

Particularly notable findings were seen in sex, education background, race, income, sources of information on the pandemic, family ties to those diagnosed with COVID-19, and utilization of protective factors. All of these categories proved to have a significant different between their WHOQOL-BREF scores for a variable during and after lockdown. Overall, only female WHOQOL-BREF scores showed higher values after lockdown in comparison to during lockdown. Those with an associate degree showed a significant increase in the WHOQOL-BREF scores after the lockdown had been lifted. Those of European descent showed a significant increase in WHOQOL-BREF scores after the lockdown had been lifted. Individuals earning incomes of two hundred thousand and more scored significantly higher after the lockdown had been removed. Individuals who did not received information about the virus through sources outside of consistently showed scores that improved after the lockdown has been lifted. Those who did not have any family connections to those diagnosed with the virus showed scores that improved after the lockdown. Most shockingly, those who did not use internal reflection, exercise, or meditation score differences for during and after lockdown were significantly higher than their counterparts who did utilize said protective factors.

5. Discussion

Being a female, searching online for coronavirus information, and being of a white non-Hispanic race were all risk factors while being of higher income was a protective factor during the COVID-19 Pandemic (Holingue, 2020). Components of the findings in this study support and refute this statement. Being a female proved to be a risk factor in the study shown in the significant improvement in their WHOQOL-BREF score after the lockdown had been lifted. Speculations state that women are overall at higher risk of losing jobs during the lockdown with seventy percent of the care force in the health-care sector are women (Gannaway, 2020). Interestingly enough, women have been found to have stronger immune systems when infected by the SARS virus where female lab mice had estrogen levels reduced to the male lab mice and then were found to have higher mortality rates in comparison to their normal estrogen levels (Channappanavar, 2017).

Previous studies have found high correlation between levels of unemployment and overall high risks of poor mental health (Ganson, 2020). This can be seen within this data by the significant improvement in WHOQOL-BREF scores after the lockdown had been lifted. More industries have been able to return to a

more regular routine after the lockdown, therefore improving their quality of life dramatically. Businesses have continued to struggle as this pandemic continues to endure, but overall there have been significant improvements for those with an associate degree after more of the county have moved into later phases of reopening.

Racial background results from this survey aligned with previous research with those who identified as white non-Hispanics receiving significantly higher scores after the lockdown had been lifted. However, this data contradicts many current studies where people of color were found to be two and a half times more likely to die from coronavirus (Armstrong, 2020). Socioeconomic conditions that remain more prevalent among communities of color in comparison to those of European decent, pointing to the larging issue of segregation and discrimination that still exist today. This study was not done without limitations. The study was conduction within only on section of Westchester County and does not fully represent the county as a whole.

As stated before, higher income has been established as a protective factor during the pandemic (Holingue, 2020). It has been able to act as a safety net, allowing individuals as well as their families to not be concerned with a continuous stream of income from what is already within their possession. This contradicts our data, where individuals with higher incomes received higher WHOQOL-BREF scores after the lockdown had been lifted.

Possibly misleading and unestablished sources have been declared to be only determinantal to its readers' mental health (Sahni, 2020). As seen in the results, individuals who received information from official news sources such as CNN, FOX, NBC were able to maintain and develop a significant increase in their WHOQOL-BREF scores after the lockdown has been lifted. News sources are more selective in reporting information, especially when put in comparison to sources outside of social media, news outlets, newspapers, or government sources. Individuals who did not utilize anything outside of the listed platforms were found to have significantly better scores after their lockdown. Information that remains filtered, concentrated, and reviewed overall benefits the public while information that is not fact checked can ultimately do more harm than anything.

Contribution of age-dependency to susceptibility of the virus are still difficult to define. Morality variations between age groups caused by COVID-19 infections still are yet to be further understood. Age-dependencies of morality rates would determine the age distribution in mortality from COVID-19 (Omori, 2020). These difficulties are still yet to be further touched upon in future reason, explaining the insignificance of our results in age being a key contributor to one's quality of life during the lockdown.

Those without family ties to those diagnosed with the virus showed significant improvement in their WHOQOL-BREF scores while those who had family connections to one or multiple people diagnosed with coronavirus had little to no improvement in their scores. This accurately supports the

hypothesis stating that those with no family connections to those diagnosed with the virus will score better than those who do have connections. For those that do have connections, their scores remained insignificant and showed no sign of improvement after the lockdown likely due to the grief of losing a loved one (Malapani, 2020).

These findings contradict our hypothesized idea of how protective factors would benefit a person's quality of life. Internal reflection, exercise, or meditation ultimately led to no change in the WHOQOL-BREF scores. This could possible mean that using these protective factors are ultimately ineffective and do not show as much promise in acting as a protective factor. This could point to a need for further study in protective factors that are more effective in improving quality of life.

In recent news, both Pfizer and Biotech have been announced to be receiving high success rates with their new vaccine candidates. Reports state that these vaccines have a efficacy rate above 90% meaning that the vaccine has been able to prevent COVID-19 symptoms for approximately 90% of volunteers when compared to volunteers that received the controlled placebo. The data will still need to be collected on the vaccine's effectiveness and consider all the demographic factors similar to the ones reviewed in this study, but further developments appear to be hopeful.

Participants in the study were largely white and had high incomes that were greater than two hundred thousand dollars per year. Associations between WHOQOL-BREF scores and variables within the same categories of the two mentioned were not able to be fully assessed due to the small quantity of responses of those variables. In future studies done on the Westchester area would preferably be done as a stratified random sample, pulling responses from most if not all counties in Westchester. Due to the limitation of time, the second survey had been pushed out while before life had returned to full normalcy. This could've resulted in slightly inaccurate data in our second survey since the population might not have fully returned to what their WHOQOL-BREF scores would've been prior to the lockdown. Future research would ideally be able to further explore the longitudinal effects of the pandemic as it continues to change and evolve beyond the initial lockdown in early spring of 2020, especially considering Westchester 's new influx of cases for coronavirus in late fall of 2020. Another spike in cases could result in an overall decrease in WHOQOL-BREF scores in the same way it had during the lockdown.

6. Conclusion

COVID-19 has had a major impact on people's quality of life all across the world. This study focused on analyzing the quality of life of a smaller Westchester community. Utilizing a demographic questionnaire and the WHOQOL-BREF, administered twice, this study revealed the many factors that were impacting participants' lives during and after quarantine. The study hypothesized that those who did

not utilize protective factors, received information from inaccurate sources, were within a lower age bracket, or had relations to those affected by the virus would end up scoring lower on the WHOQOL-BREF than those who utilized protective factors, received accurate data from official sources, were within an older age bracket, or had no relations to those affected by the virus. Data indicated that only part of the hypothesis was proven.

There were significant results relating to participants' use of established sources and those who knew of or had lost loved ones during the pandemic. Participants who received information from established and reliable sources such as the CDC, news outlets (CNN, FOX, NBC, etc.), and newspapers (The Washington Post, The New York Times, New York Post, etc.) had a higher score on the WHOQOL-BREF than those who received their information regarding the pandemic from social media platforms. This may be considered a promising aspect in determining how social media can influence people's views on events, especially a global pandemic where there already is widespread panic and fear. Additionally, our results regarding participants' relations to those affected by COVID-19 supported our hypothesis. When people have a loved one who is ill or has passed away, it creates an environment filled with grief and sadness. Due to the mass spreading of coronavirus, the infection and death rates have been consistent which means that more people now know others infected or affected by it now than they did when this study began.

Interesting results were presented when looking at the impact of protective factors on the participants' quality of life. It was hypothesized that those who utilized protective factors such as meditation, reflection, and exercise were going to have higher scores on the scale than those who did not. The act of participating in these activities have been shown in previous studies to reduce the affect that risk factors have on someone's situation. There were no significant differences between those who did and did not use these coping mechanisms. Regardless, future research should continue to explore the effects of protective factors on a larger and more diverse cohort during this pandemic and those that follow.

There seemed to be a general consensus that participants in the community who were white, had at least an associate degree, and were in a higher household income bracket, would score the highest overall than any of the other categories. An interesting find was the female population experienced an increase in their score following the lockdown. Future research should certainly further test the effects on people's quality of life during and after the COVID-19 pandemic in a longitudinal study.

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8. Certifications

Student Certifications

STUDENT
Certification

The Student, Teacher and Scientist Certifications are the last pages of the research paper.

Student Name: Michelle Ho   School Name: Briarcliff High School

Please be as specific as possible in answering the following questions.

1. What steps led you to your hypothesis (where did you get the idea for your research)?

Our research had stemmed from the need for further available data on the general public's quality of life evaluation in response to the COVID-19 Pandemic. Very minimal research has been done the general public's quality of life in response to the pandemic, and our study would be able to offer new insight into the topic. This research would also be a useful in promoting research in mental and phyiscal health and could point to ways in detering patterns in human behavior in comparable situations.

2. Where did you conduct the major part of your work (home, school, other institutional setting, university lab, medical center, etc.)?

A majority of the work was conducted at home due to the restrications put in place by the coronavirus. Information was collected through the digital platform SurveyMonkey and anaylsed with Microsoft Excel.

3. If you worked in an institutional setting, did you work on your project as part of a team/group? If YES, who was on the team (students, adult researchers, etc.) and what was your role?
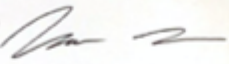
N/A

4. Describe the parts of the research you did on your own and where you received help (literature search, hypothesis, experimental design, use of special equipment, gathering data, evaluation of data, statistical analysis, conclusions and preparation of written report (abstract and/or paper).

Experimental design was done in partial collaberation with adult sponsors. We completed the literature search, hypothesis, gathering and evaluation of data, and writing of paper.

5. If this is a continuation of an investigation that was previously submitted to a Sub-Regional JSHS describe how you have expanded your investigation?

N/A

Student Signature
(hand written)   Date Oct 26, 2020

STUDENT
Certification

The Student, Teacher and Scientist Certifications are the last pages of the research paper.

Student Name: Despina Xynidakis

School Name: Briarcliff High School

Please be as specific as possible in answering the following questions.

1. What steps led you to your hypothesis (where did you get the idea for your research)?

Our research had stemed from the need for further available data on the general public's quality of life evaluation in response to the COVID-19 Pandemic. Very minimal research has been done the general public's quality of life in response to the pandemic, and our study would be able to offer new insight into the topic. This research would also be a useful in promoting research in mental and phyiscal health and could point to ways in detering patterns in human behavior in comparable situations.

2. Where did you conduct the major part of your work (home, school, other institutional setting, university lab, medical center, etc.)?

A majority of the work was conducted at home due to the restrications put in place by the coronavirus. Information was collected through the digital platform SurveyMonkey and anayized with Microsoft Excel.

3. If you worked in an institutional setting, did you work on your project as part of a team/group? If YES, who was on the team (students, adult researchers, etc.) and what was your role?

N/A

4. Describe the parts of the research you did on your own and where you received help (literature search, hypothesis, experimental design, use of special equipment, gathering data, evaluation of data, statistical analysis, conclusions and preparation of written report (abstract and/or paper).

Experimental design was done in partial collaberation with adult sponsors. We completed the literature search, hypothesis, gathering and evaluation of data, and writing of paper.

5. If this is a continuation of an investigation that was previously submitted to a Sub-Regional JSHS describe how you have expanded your investigation?

N/A

Student Signature
(hand written) *Despina Xynidakis*

Date 11/20/20

Mentor Certifications

SCIENTIST MENTOR
Certification

The Student, Teacher and Scientist Certifications are the last pages of the research paper.

Student Name: Michelle Ho

School Name: Briarcliff High School

Your sharing of information reflects strongly on the student's performance.

1. State the origin of the project idea: Was it an assignment, chosen from a list of possibilities, the student's suggestion, or did it arise from discussion, continuation of previous work?
The student's origin of the project was completely through their suggestion. They thought of the idea when the pandemic began.

2. Did the student work on the project as a team member? If yes, please state the make-up of the team; i.e., whether they were students, professional researchers, etc. Please describe the student's role on the team.
This was an independent student-led project where professionals guided them.

3. Estimate the student's level of dependence (0%) versus independence (100%) on each part of the project listed below. Example: For a student on a three member team who worked as a fully participating member, the answer would be 30-35%.

Experimental design	50	%	Gathering data	50	%
Choice of techniques	40	%	Evaluation of data	50	%
Use of special equipment	50	%	Results/discussion	50	%
Construction of equipment	45	%			

4. How many weeks was the student's research project at your institution? N/A

5. Indicate whether or not the student received a salary or other compensation for this research
☐ yes   ✔ no   If yes - dollar amount

6. Other comments

Supervising Scientist: Kim Morrison, NP

Email: KimNMorrison@gmail.com

Affiliation: Independant

Phone: 917-484-1202

Signature (hand-written): *Kim Morrison*

Date: 11/11/20

SCIENTIST MENTOR
Certification

The Student, Teacher and Scientist Certifications are the last pages of the research paper.

Student Name: Despina Xynidakis

School Name: Briarcliff High School

Your sharing of information reflects strongly on the student's performance.

1. State the origin of the project idea: Was it an assignment, chosen from a list of possibilities, the student's suggestion, or did it arise from discussion, continuation of previous work?
The student's origin of the project was completely through their suggestion. They thought of the idea when the pandemic began.

2. Did the student work on the project as a team member? If yes, please state the make-up of the team; i.e., whether they were students, professional researchers, etc. Please describe the student's role on the team.
This was an independent student-led project where professionals guided them.

3. Estimate the student's level of dependence (0%) versus independence (100%) on each part of the project listed below. Example: For a student on a three member team who worked as a fully participating member, the answer would be 30-35%.

Experimental design	50	%	Gathering data	50	%
Choice of techniques	40	%	Evaluation of data	50	%
Use of special equipment	50	%	Results/discussion	50	%
Construction of equipment	45	%			

4. How many weeks was the student's research project at your institution? N/A

5. Indicate whether or not the student received a salary or other compensation for this research
☐ yes   ☑ no   If yes - dollar amount

6. Other comments

Supervising Scientist: Kim Morrison, NP   Email: KimNMorrison@gmail.com

Affiliation: Independant   Phone: 917-484-1202

Signature (hand-written): *Kim Morrison*   Date: 11/11/20

Teacher Certifications

TEACHER
Certification

The Student, Teacher and Scientist Certifications are the last pages of the research paper.

Student Name: Michelle Ho

School Name: Briarcliff High School

Specific comments will help judges understand the student's motivation, independence, overall performance and your input in the selection process of this student's research.

1. **Originality, Motivation, Creativity, Ingenuity**: Discuss the student's role in identification and selection of the project; where he/she received help; i.e., literature search, hypothesis, experimental design, use of special equipment, gathering data, evaluation of data, statistical analysis, conclusions and preparation of written report – abstract and/or paper.

   After her original research project was cancelled due to Covid-19, Michelle was able to join forces with her teammate Despina and they quickly collaborated and decided they wanted to do research that could make a difference in the midst of the pandemic. They received guidance from their mentor and from the members of the IRB, encouraging them to research personal protective factors, and they received statistical guidance from Jeffrey Ho. They also received guidance from Dr. Ellen Cohen regarding the reporting of their findings.

2. **Initiative**: The student's role if this was a team project, the nature of that team, i.e., other participants and the student's role on that team.

   Michelle's role was to collect and analyze the data and report the findings. Michelle and her teammate Despina worked in collaboration on creating the survey, administering the survey, and making discussion points about the data.

3. **Other comments**: Regarding the student's investigation, independence, overall performance and motivation. This is your opportunity to give judges a ranking of your student versus other students.

   Michelle and Despina worked very well together and were very motivated to administer their survey, collect the data, and analyze the results. They demonstrated initiative, independence and competence in the completion of this research. Michelle's work over the past 3 years has consistently been of the highest quality, and has never required reminders from her teachers.

Teacher Name: Annmarie O'Brien

Signature (hand written): *Annmarie O'Brien*

Date 11/21/20

TEACHER
Certification

The Student, Teacher and Scientist Certifications are the last pages of the research paper.

Student Name: **Despina Xynidakis**

School Name: **Briarcliff HS**

Specific comments will help judges understand the student's motivation, independence, overall performance and your input in the selection process of this student's research.

1. **Originality, Motivation, Creativity, Ingenuity:** Discuss the student's role in identification and selection of the project; where he/she received help; i.e., literature search, hypothesis, experimental design, use of special equipment, gathering data, evaluation of data, statistical analysis, conclusions and preparation of written report – abstract and/or paper.

Despina selected her project after the pandemic began. She saw the need for a study like this to be done in her community and she took the opportunity that was handed to her. Despina and her partner managed to find a mentor, plan a project, and get an IRB approved in a matter of months. They sent out their first survey during the midst of the pandemic. Despite the challenge, they were able to receive many responses. Recently, they sent out their second survey and were able to have another successful round of data collection.

2. **Initiative:** The student's role if this was a team project, the nature of that team, i.e., other participants and the student's role on that team.

Despina did this project with a partner, Micelle. Despina was the lead student who came up with the research idea and found their mentor. Both of the students collected and analyzed the data.

3. **Other comments:** Regarding the student's investigation, independence, overall performance and motivation. This is your opportunity to give judges a ranking of your student versus other students.

Despina is an excellent student. She is very independent and highly motivated and ranks in the top 25 % of students I have taught

Teacher Name: Michael Inglis

Signature
(hand written)

Date 11/20/2020