

<https://doi.org/10.33472/AFJBS.6.9.2024.156-164>

African Journal of Biological Sciences

Journal homepage: <http://www.afjbs.com>

Research Paper

Open Access

Original Article

Neuroinflammatory Consequences of COVID-19 on Psychological Well-Being among Filipino Teachers in Marawi: A Cross-Sectional Study

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Article Info

Abstract

Article History
 Volume 6, Issue 9, 2024
 Received: 11 Mar 2024
 Accepted: 04 Apr 2024
 doi: 110.33472/AFJBS.6.9.2024.156-164

Introduction

In the Philippines, the impact of the virus has been profound, with a significant number of confirmed cases and deaths, particularly concentrated in urban centers like the National Capital Region. The pandemic has not only posed a grave threat to public health but has also led to a surge in mental health issues, economic hardships, and disruptions to education.

Purpose

This study aims to investigate the impact of COVID-19 on depression, anxiety, and stress as predictors of physical health among 111 elementary and secondary teachers in MSU-ILS, Marawi City, Philippines, who experienced siege warfare before the pandemic crises—conducted in 2022.

Methods

The research utilized standard questionnaires and employed descriptive, correlational, and predictive designs, geared towards expanded information and in-depth understanding of COVID-19's impact on negative emotional and physical health, for early interventions and manifestations.

Results

Low levels of negative emotional states, depression, anxiety, and stress; likewise, good physical health was recorded among respondents. However, by cumulative percent analysis, a minority experienced high to very high disorder symptoms of negative emotional state, depression, anxiety, stress, and poor-to-very poor physical health status. More importantly, the majority demonstrated very low-to-fair negative emotional states, depression, anxiety, and stress; and fair-to-very good physical health states amidst the COVID-19 crisis and previous warfare experiences. Correlational analysis (r) revealed significant negative relationships between depression, anxiety stress (negative emotional state), and physical health. Higher levels of these negative emotional states of depression, anxiety, and stress are associated with poorer physical health status. Confirming negative emotional states; depression, anxiety, and stress as negative linear predictors of physical health status. Determination analysis (r^2) confirmed depression, anxiety, and stress respectively predict: 12.89%, 9.73%, and 16.89% of the physical health; stress emerged as the ultimate predictor of physical health.

Conclusion

Despite the COVID-19 epidemic, many teachers demonstrate high perseverance levels in the face of stress, anxiety, and depression while maintaining good physical health.

Keywords: Impact of COVID-19, Depression, Anxiety, Stress, Physical Health, Filipino teachers

Introduction

The emergence of COVID-19 has triggered a global crisis of unprecedented proportions since its initial appearance in Wuhan, China, in December 2019 declared a pandemic by the World Health Organization in March 2020, COVID-19 has rapidly spread across continents, claiming millions of lives, and exacerbating socio-economic challenges worldwide (UNDP, 2020). In the Philippines, the impact of the virus has been profound, with a significant number of confirmed cases and deaths, particularly concentrated in urban centers like the National Capital Region. The pandemic has not only posed a grave threat to public health but has also led to a surge in mental health issues, economic hardships, and disruptions to education (WHO, 2020). Philippines COVID-19 Situation Report 50, 2020).

Certainly, the educational landscape has been significantly impacted by COVID-19, with the rapid adoption of flexible learning modalities transitioning from traditional face-to-face instruction. These adaptations have been crucial in ensuring the safety of students and educators while mitigating the spread of the virus (Isla, 2020). Nonetheless, these shifts have brought about challenges that both teachers and students must confront. The novelty of online schooling, coupled with the absence of interpersonal interaction with peers and instructors, has led to notable adverse effects, overshadowing any potential benefits (Fadare et al., 2021; Northenor, 2020).

In response to these concerns, the Department of Education took proactive measures, conducting nationwide psychosocial support sessions and related activities in the week leading up to the October school reopening, acknowledging the profound impact of the COVID-19 pandemic on students' mental well-being (WHO, 2020). Aligned with this, an abundance of research in the realm of education during the COVID-19 era has emerged: students have witnessed a surge in stress, anxiety, and depression (Aslan et al., 2020), experienced heightened negative emotions such as fear, worry, or boredom (Aristovnik et al., 2020; Son et al., 2020), stress has been linked to adverse outcomes for students like diminished academic performance (Sohail, 2013), and the onset of mental or psychosomatic symptoms including dissatisfaction, restlessness, propensity for distraction, insomnia, difficulty concentrating, or apathy (Herbst et al., 2016).

Most of the studies are centered on students and adopt a predominantly descriptive approach. Although descriptive

research has provided valuable insights into the immediate effects of the pandemic, there is a call for broader perspectives and more scientific approaches to understanding its multifaceted impact. This includes examining the role of teachers as key stakeholders in the education system and considering the unique challenges faced by communities like Marawi City, Philippines, which has been doubly affected by prior siege warfare.

Against this backdrop, the proposed study aims to investigate the impact of COVID-19 on teachers' emotional or mental states and physical health well-being at Mindanao State University, Marawi City, Philippines. By employing comprehensive research methodologies, including descriptive analyses, correlational assessments, and predictive modeling, the study seeks to provide a deeper understanding of the nuanced dynamics at play. Ultimately, this research endeavor aims to contribute to the body of knowledge on COVID-19's impact on education and inform evidence-based interventions to support the well-being of teachers and students alike.

COVID-19 Pandemic

The coronavirus, originating in Wuhan, China in December 2019, is a highly infectious communicable disease posing a significant threat to public health and safety, as highlighted by the World Health Organization (WHO, 2020; Ma et al., 2020). Designated as a Public Health Emergency of International Concern by WHO within a month of its outbreak, COVID-19, caused by the novel coronavirus SARS-CoV-2, has led to a global pandemic of respiratory illness (Sauer, 2020).

The parallels with the 2003 SARS outbreak, as noted by Xiang et al. (2020), underscore the severity of the current COVID-19 pandemic, which profoundly impacts global and mental health (Torales et al., 2020). While most infected individuals experience mild to moderate respiratory symptoms, older adults and those with underlying medical conditions are at higher risk of developing severe illness (WHO, 2020).

The COVID-19 pandemic, reaching every continent except Antarctica, has tragically resulted in over a million deaths, highlighting its status as a defining global health crisis (Ma et al., 2020). Beyond its immediate health implications, the pandemic has triggered a socio-economic crisis affecting countries worldwide, as emphasized by the United Nations Development Program (UNDP, 2020). Moreover, as Perrin et al., (2009). illustrate, pandemics pose significant threats

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not only in terms of pathophysiological mechanisms but also in terms of psychological and behavioral reactions within affected populations. Thus, COVID-19 represents not only a health crisis but also a socio-economic and psychological challenge of unprecedented proportions.

In summary, COVID-19 epitomizes a global health crisis with multifaceted dimensions, necessitating comprehensive responses addressing its medical, socioeconomic, and psychological aspects.

Depression, Anxiety, and Stress: Impact of Covid-19

The COVID-19 pandemic has profound implications for mental health, including depression, anxiety, and stress, which encompass emotional, cognitive, behavioral, social, and psychological well-being (Felman, 2020). Mental health is emotional, psychological, and social well-being, influencing thoughts, feelings, and actions, and aiding in stress management, interpersonal relationships, and decision-making. The Philippines responded to the pandemic with community quarantine measures, leading to increased anxiety and stress among the population (WHO, 2020). This outbreak has global implications for mental health, resulting in a range of issues such as depression, anxiety, insomnia, and anger (Torales et al., 2020). However, these mental health challenges are less visible than the physical symptoms of COVID-19 (Nortajuddin, 2020).

The pandemic presents unprecedented threats to psychological well-being, necessitating tailored interventions for vulnerable groups (Salari et al., 2020). Vulnerable populations are particularly susceptible to emotional distress, fear, and societal behaviors driven by uncertainty (Shigemura et al., 2020). Studies conducted in China highlight gender differences in post-traumatic stress symptoms and the impact of sleep quality on mental health (Liu et al., 2020). Furthermore, research shows elevated levels of stress among healthcare workers treating COVID-19 patients (Srivastav et al., 2020).

Preliminary evidence suggests common psychological reactions to the pandemic, including anxiety, depression, and stress (Rajkumar, 2020). Representative research from various affected countries, particularly focusing on vulnerable populations, is needed to fully understand the mental health implications of the pandemic (Rajkumar, 2020). Additional studies reveal moderate-to-high levels of perceived stress and mental health problems among respondents (Yali et al., 2020). The DASS-21 questionnaire proves effective in assessing depression, anxiety, and stress

levels during the pandemic (Tee et al., 2020), revealing high prevalence rates of these mental health issues among respondents.

The COVID-19 pandemic exacerbates mental health challenges worldwide, necessitating comprehensive interventions and research efforts to address the psychological impact on individuals and communities.

Physical Health Amidst COVID-19

Physical health, comprising various components such as physical activity, nutrition, rest, and medical self-care, is integral to overall well-being (Koshuta & Chapel, 2015). The COVID-19 pandemic has prompted a reevaluation of physical health and well-being, underscoring the importance of disease prevention, and safeguarding individual health (Purdue University, 2020). While the pandemic has led to disruptions in exercise routines due to remote work and restricted movements, maintaining physical activity is essential for both physical and mental health (Nuvance Health, 2020).

During the pandemic, physical activity becomes even more crucial, as it helps alleviate muscle strain and mental tension, and improves blood circulation (WHO, 2020). However, the lack of access to typical coping strategies, such as gym visits, can contribute to stress and anxiety. Physical inactivity carries significant global health implications, contributing to millions of deaths annually and increasing the risk of chronic diseases (Lee, 2012). Poor physical health can also exacerbate mental health issues, highlighting the interconnectedness of physical and mental well-being (Mental Health Foundation, 2016).

Quarantine measures during the pandemic not only impact mental health but also lead to reduced physical activity, potentially compromising immune function and overall physiological health (Srivastav et al., 2020). Physiotherapy professionals and students play a vital role in promoting physical activity and must anticipate changes in activity levels during quarantine (Qui et al., 2020; Lai and Wang, 2020). Engaging in regular physical activity not only reduces the risk of chronic diseases but also alleviates symptoms of depression and anxiety (Piercy et al., 2020).

The pandemic has had profound effects on weight management, with increased anxiety, depression, and challenges in achieving weight loss goals reported among patients (Almandoz et al., 2020). Despite these challenges, each day presents an opportunity to prioritize physical

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activity and reap its numerous benefits for mood, sleep, and overall health.

Methodology

Research Design.

This research employs a descriptive, correlational, and predictive design. Descriptive research, which can be qualitative or quantitative, is utilized to depict the current situation. Specifically, quantitative descriptive research aims to present information without delving into causal relationships. Descriptive statistics are utilized to describe phenomena rather than infer cause and effect. This approach is applicable across various disciplines and provides a swift method to transform data into knowledge. In this study, descriptive analysis focuses on the Independent Variables of depression, anxiety, and stress, as well as the Dependent Variable of physical health.

A correlational research design is implemented to investigate the strength, direction, and existence of relationships between Independent and Dependent Variables using correlation coefficient statistics. Predictive design is employed to ascertain the predictive accuracy of the relationship between Independent and Dependent Variables through determination coefficient statistics. This aspect of the research seeks to determine the extent to which Independent Variables predict outcomes on Dependent variables.

The population of study consisted of elementary and secondary teachers at the MSU-Integrated Laboratory School who were officially teaching subjects during the academic year 2022-2023. The MSU-IL utilizes a modular flexible learning approach. A total of 115 faculty members, with 64 from the Elementary Department and 51 from the High School Department. The final number of respondents who completed the questionnaire was 111, resulting in a retrieval rate of 96.52%. The researcher employed a complete enumeration sampling technique, facilitated by the university authorities on campus. Unlike random sampling, complete enumeration ensured that all eligible respondents within the campus, utilizing the modular flexible learning approach, had the opportunity to participate in the study. This approach enabled the researcher to gather the maximum feedback and reliable results regarding the impact of the COVID-19 pandemic.

Research Instruments.

Data collection was conducted via physical means using two (2) standardized self-rated research questionnaires, the

DASS-21, and the Healthy Habit. The DASS-21 questionnaire is developed by consultant clinical psychologist Fernando Gomez, a 21-item self-report tool designed to gauge (-) emotional states of depression, anxiety, and stress, with reliabilities: 0.94 for depression, 0.87 for anxiety, and 0.91 for stress (Anthony et al., 1998).

The Healthy Habit questionnaire is based on a self-rated questionnaire derived from the Australian Public Service Commission (2020), encompassing elements such as regular physical activity, good nutrition, hydration, quality sleep, and self-care. This instrument aims to assess respondents' physical health status.

Data Collection Procedures.

This section outlines three key stages: preliminary, actual data collection, and post-data management. Driven by accreditation requirements, the study investigates the impact of COVID-19 on elementary and secondary level teachers at Mindanao State University- Marawi, Philippines encompassing both laboratory and external campuses employing modular flexible learning modalities. Before the commencement of data collection, the researcher submitted a letter request to the President of the Mindanao State University System (MSUS) through the Vice Chancellor for Academic Affairs (OVCAA), seeking authorization to conduct the study and procure the faculty list, particularly for in-campus MSU-ILS elementary and secondary level teachers, via physical data gathering. Following approval, an Intent Letter was sent to the head/director of MSU-ILS requesting permission to conduct the study, along with the approved OVCAA copy. Subsequently, research assistants were instructed on the immediate distribution and retrieval possible, of the coded Respondents' questionnaires, accompanied by a Respondents' Letter-Request. Upon questionnaire retrieval, respondent answers were tabulated using a quantification of data form in Microsoft Excel, ready for data analysis.

Data Analysis.

The statistical treatment of the gathered data utilized descriptive, correlation, and predictive for analysis and interpretation. For the descriptive analysis, the respondents were characterized and examined using Measures of Central Tendencies, including frequency, percent, and 2-way cumulative percent distributions, as well as grand and component means. In the correlation analysis, the Product-Moment Correlation Coefficient, also known as Pearson r-test statistics, was employed. Developed by Karl Pearson around 1900, this statistical tool assesses and quantifies the

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strength of linear relationships between two sets of interval-scaled and/or ratio-scaled variables (Lind, 2000).

To determine the predictive accuracy, the Coefficient of Determination (r^2) was utilized. This measure reinforces and offers a more precise interpretation of the correlation findings (Dunn, 2001). Predictive accuracy refers to the percent contribution of one variable to a correlated one.

Ethical Consideration

The following principles were strictly observed during the conduct of the study.

Protection of Human Rights.

Ethical standards were followed for the protection of the respondents' interests: the ideals of respect for people, charity, and justice. The first principle is that of *respect for persons*. By this concept, the respondents undertake the exercise of autonomy.

This applies to respondents' right to decide what activities they take or will not take part in. Participants are made to understand what they are being asked to do in the study which is simply to answer a survey questionnaire on their knowledge, attitude, and practices on antimicrobial stewardship and make a rational decision on the impact of participating in the research on them and make a choice to participate freely or willingly free of coercion, restriction, or undue influence. As evidence of this willingness, a consent form was used to signify the willingness of the respondents to participate.

The principle adhered also was *beneficence*, related to the researcher's duty to maximize the study's benefits and minimize the risks. The principle also requires that the researcher would not cause any harm to the respondents, and this was achieved in the research by not implementing any treatments, procedures, or alternatives.

The third principle was *justice* which explained that the respondents should be selected equitably. To do this, criteria for inclusion and exclusion were used when recruiting the participants. Further, the study did not include any vulnerable subjects. Respondents were subjected to the same data collection process in which to answer a questionnaire either through face-to-face intercept or online with a Google form. The study would make the bona fide respondents one of the beneficiaries of this research.

The principle of *transparency* was observed as the

researcher intended to provide a copy of the study and its output to the MSUS Marawi campus' Office of the President and Office of the Vice President for Research. The researcher also hoped to publish and present the study in the international journal publication and international research congress.

Results and Discussions

The findings [Table 1] from the mean analyses, the respondents reported low levels of negative emotional states (Grand Mn=1.17 low), depression (Mn=1.08 low), anxiety (Mn=1.15 low), and stress (Mn=1.27 low); similarly, good physical health status (Mn=2.64 good) [Table 2]. This suggests a resilience and ability to cope among the teaching population, even in the face of significant stressors like the pandemic and prior experiences of siege warfare.

Table 1. Respondents' Levels of Depression, Anxiety and Stress amidst Covid-19 Pandemic

(-) Emotional State		Depression			Anxiety			Stress			Average
Interval	Label	(f)	%	Cum%	(f)	%	Cum%	(f)	%	Cum%	%
≥ 3.22	Very High	1	0.9	0.9	1	0.9	0.9	3	2.7	2.7	
2.41-3.21	High	11	9.9	10.8	12	10.8	11.7	11	9.9	12.6	11.7
1.60-2.40	Fair	15	13.6	89.2	11	9.9	88.3	18	16.2	87.4	88.3
0.79-1.59	Low	40	36.0	75.6	49	44.2	78.4	47	42.4	71.2	
≤ 0.78	Very Low	44	39.6	39.6	38	34.2	34.2	32	28.8	28.8	
Component Mean		1.08 Low			1.15 Low			1.27 Low			
Grand Mean		1.17 Low									

N=111

However, cumulative percent analyses expose, a minority (11.7% average) of respondents did report high-to-very high levels of depression (10.8%), anxiety (11.7%), and stress (12.6%), similarly, poor-to-very poor physical health (7.1%) [Table 2]. This underscores the importance of addressing emotional and physical health concerns among teachers, as even a small percentage experiencing severe symptoms can have significant implications for their well-being and effectiveness in the classroom.

Table 2. Respondents' Level of Physical Health amidst COVID-19

Physical Health Level				
Interval	Magnitude Label	(f)	(%)	Cumulative (%)
≤ 0.78	Very Poor	2	1.8	1.8
0.79-1.59	Poor	6	5.4	7.2
1.60-2.40	Fair	34	30.6	92.8
2.41-3.21	Good	50	45.1	62.2
≥ 3.22	Very Good	19	17.1	17.1
Mean		2.64 Good		

N=111

The correlation analyses (r) [Table 3] reveal significant ($p < 0.01$) negative relationships between the independent variables negative emotional state of depression ($r = -.392^{**}$), anxiety ($r = -.343^{**}$), and stress ($r = -.437^{**}$) and the independent variable physical health. These imply that

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higher levels of these (-) emotional states and their components are associated with poorer physical health status while lower levels are associated with better physical well-being. It confirms the widely recognized link between emotional/or mental and physical health, emphasizing the need for holistic approaches to wellness that address both aspects.

Table 3. Correlation Between Independent and Dependent Variables

Dependent Variable Independent Variables	Physical Health			Decision
	(p)	(r)	(r ²) %	
Depression	.000	-.392**	15.37	Reject H ₀
Anxiety	.000	-.343**	11.77	Reject H ₀
Stress	.000	-.437**	19.10	Reject H ₀

N=111; **Significant at .01 level (2-tailed); *Significant at .05 level (2-tailed)

Furthermore, through determination analyses (r²) [Table 3]; depression, anxiety, and stress levels respectively predict: 15.37%, 11.77%, and 19.10% of the physical health state; highlighting stress as the best negative predictor of physical health amidst COVID-19 crises.

Overall, these findings underscore the importance of prioritizing emotional/or mental health support for teachers, particularly during times of crisis like the COVID-19 pandemic. Implementing strategies to reduce depression, anxiety, and stress and promote physical well-being among teachers is essential for their own sake and crucial for maintaining a high standard of education and ensuring positive outcomes for students (Fadare et al., 2022, Pagdato et al., 2021).

Conclusion

Despite the Covid-19 pandemic, most teachers exhibit resilience against depression, anxiety, and stress, while maintaining good physical health. However, these mental health factors significantly predict physical well-being, with stress being the most influential, followed by depression and anxiety. Despite pandemic-related challenges, Filipino teachers from Marawi City, who endured siege warfare before COVID-19 pressures, demonstrate robust emotional and physical health states, aligning with Bandura's self-efficacy theory. This underscores Filipino teachers' remarkable resilience in overcoming adversities amidst the pandemic.

Recommendation

Based on the findings that a minority of respondents exhibited high-to-very high levels of depression, anxiety, and stress symptoms, alongside a few compromised

physical health, the researcher recommends: **MSU administrators** should issue directives to the heads of external units to devise coping activity programs. These programs aim to comprehensively address the detrimental effects of depression, anxiety, and stress, as well as negative emotional states among teachers amidst the ongoing COVID-19 pandemic. The objective is to alleviate these issues in the long term. **MSU teachers** should be provided with adequate time and resources dedicated to enhancing their emotional, physical, and overall well-being. The rationale behind this recommendation lies in the understanding that the well-being of teachers directly influences the academic performance of their students. **Further research** employing advanced quantitative and qualitative methodologies should be conducted to deepen our understanding of the impact of COVID-19 on emotional and physical well-being. Such endeavors will add robustness and depth to our comprehension of these manifestations.

By implementing these recommendations, institutions can better support the mental and physical health of their teachers and, by extension, contribute positively to the academic outcomes of their students.

Acknowledgment

To all the teachers who took part in this study, the principal of MSU ILS, Dr. Adlawan A. Hendely, the dean of CSPEAR, Dr. Stephen A. Fadare, who served as our internal peer reviewer, are all thanked by the authors. We express our gratitude to the editor and the anonymous peer reviewers for their insightful assessments of the work. Glory be to the All-Powerful God. Amen

Conflict of interest

No conflict of interest to declare

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