

Post-Pandemic Stress and Rapid Technological Shifts Among ICU Staff: Basis for a Training Program Recommendation

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ABSTRACT

This study explored the association between post-pandemic stress, coping strategies, and the perceived effects of technological changes among intensive care unit (ICU) nurses in selected tertiary hospitals in Davao del Norte. A quantitative descriptive-correlational research design with comparative analysis was adopted, and all eligible ICU nurses were included through total population sampling. Data were obtained using three established instruments: the Stress Appraisal Measure (SAM), the Coping Inventory for Stressful Situations (CISS), and the Unified Theory of Acceptance and Use of Technology (UTAUT) questionnaire. The collected data were analyzed using frequencies, percentages, weighted means, standard deviations, Pearson correlations, and comparative statistical tests. The results indicated that ICU nurses continued to experience moderate post-pandemic stress despite the easing of the public health crisis. Task-oriented coping emerged as the primary strategy for managing stress, while avoidance-oriented and emotion-oriented coping were used less frequently. The findings also showed that technological advancements influenced nursing practice, with performance expectancy receiving the highest ratings, whereas effort expectancy suggested that some nurses still encountered challenges in using new technologies. Overall, the study emphasizes the importance of strengthening stress management programs and providing continuous digital skills training to help ICU nurses adapt effectively to evolving healthcare technologies while maintaining their well-being and quality of patient care.

Keywords: *Post-pandemic stress, intensive care unit nurses, technology acceptance, coping mechanisms, healthcare technology, UTAUT, nursing workforce*

INTRODUCTION

The Philippines continues to face a persistent nursing shortage, intensified by the COVID-19 pandemic, exposing nurses to burnout, discrimination, understaffing, and increased workloads. ICU nurses have been particularly affected because of their prolonged exposure to critically ill patients and the ongoing demands of high-acuity care. At the same time, the rapid adoption of healthcare technologies, including electronic health records, tele-ICU systems, AI-assisted monitoring, and digital decision-support tools, has improved healthcare delivery while increasing nurses' cognitive and technical demands. Although previous studies have examined occupational stress during the pandemic, limited research has explored the long-term effects of post-pandemic stress or its relationship with technological changes, especially among ICU nurses in the Philippine setting. This study addresses this gap by investigating the combined influence of post-pandemic stress and technological shifts on nurses, with the goal of providing evidence for the development of stress management interventions, technology competency training programs, and future research on nurses' adaptation in post-pandemic healthcare environments.

Statement of the Problem

The study aimed to determine the impact of post-pandemic stress and technological shifts on nurses. More specifically, this study sought to answer the following questions:

1. What are the demographic characteristics of the nurses and nursing attendants, in terms of age, gender, sex, highest educational attainment, and years of experience?
2. What is the level of post-pandemic stress among nurses and nursing attendants, in terms of primary appraisal, secondary appraisal, and coping strategies?
3. What is the level of technological shifts among nurses and nursing attendants, in terms of performance expectancy, effort expectancy, social influence, facilitating conditions, behavioral intention, and use behavior?
4. Is there a significant relationship between technological shifts and post-pandemic stress among nurses and nursing attendants?
5. Is there a significant difference in the level of technological shifts among ICU nurses and nursing attendants when grouped according to their demographic characteristics?
6. Based on the study's findings, what training program could be proposed to address the identified needs related to post-pandemic stress and technological shifts among ICU nurses and nursing attendants?

Scope and Delimitations

The study focuses on nursing attendants and registered nurses working in the intensive care unit (ICU) of the selected tertiary hospital(s) in Davao del Norte. It seeks to ascertain the extent of post-pandemic stress experienced by ICU staff, as well as their level of technological adaptability to rapid changes in healthcare settings. Additionally, the study aims to determine whether post-pandemic stress and technological shifts among ICU staff are significantly correlated. A training program to address the identified needs of ICU healthcare personnel may be proposed based on the study's findings.

Review of Related Literature

Based on the different studies, it was found that early-career nurses are particularly vulnerable to secondary traumatic stress due to the pandemic. Factors such as age, gender, and job satisfaction contribute to high stress levels among students pursuing public health and preventive medicine. (Ashi et al., 2024) Medical specialists with high responsibility are the most burdened, experiencing anxiety and stress related to COVID-19 and post-traumatic stress disorder. (Eichenberg et al., 2024) Rapid technological shifts have accelerated changes in healthcare, forcing nurses to adapt to new ways of providing safe care. Integrating quality and safety competencies into education and practice is crucial for fostering positive patient outcomes. (Altmiller & Hopkins Pepe, 2022)

Theoretical Framework -

The study is anchored in the Transactional Model of Stress and Coping by Lazarus and Folkman (1984), which explains that stress results from an individual's appraisal of challenging situations and their perceived ability to cope with them. This framework guided the assessment of nurses' post-pandemic stress and their responses to workplace demands. The study also adopts the Coping Theory/Coping Styles Framework, which describes how nurses manage stress through relatively stable coping strategies. It examines the use of task-oriented, emotion-

oriented, and avoidance-oriented coping in responding to the challenges of post-pandemic healthcare. To explain technology adoption, the study is based on the Unified Theory of Acceptance and Use of Technology (UTAUT).

Conceptual Framework

This study explores how nurses experience post-pandemic stress as they adapt to technological changes in healthcare, using the Transactional Model of Stress and Coping to examine stress appraisal and emotional responses. It also applies the Coping Theory/Coping Styles Framework to evaluate task-oriented, emotion-oriented, and avoidance-oriented coping strategies and their influence on nurses' psychological well-being and professional performance.

METHODOLOGY

This study used a quantitative descriptive-comparative-correlational research design to determine the impact of post-pandemic stress and technological shifts on nurses.

Research Design

This study used a quantitative descriptive-comparative-correlational research design. This design was chosen because the study entails gathering and analyzing numerical data to ascertain the degree of post-pandemic stress and technological shifts among ICU nurses, examine variations in technological shifts by demographic traits, and determine correlations among the study variables.

Research Steps

The correlational component was employed to ascertain whether post-pandemic stress and technological shifts among ICU nurses and nursing attendants are significantly correlated. The degree and direction of correlations between variables are examined in correlational research. (Sreekumar, 2024)

Data Collection and Sample Selection-

The population of this study consists of all nurses assigned to the ICUs of the two selected hospitals. Staff from both institutions will be included in the study to maximize participation and achieve a target sample size of 50–60 ICU nurses using G*Power 3.1.

Data Analysis Methods

The data were arranged, coded, and analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics, namely frequency, percentage, and mean, were used to describe the demographics of the respondents and evaluate the level of post-pandemic stress and technological shifts among ICU nurses and nursing attendants.

Research Hypotheses and Validation

The study hypothesized that there would be no significant difference in the perceived impact of technological shifts when respondents were grouped according to their demographic characteristics. To ensure the accuracy, reliability, and validity of the data collected, the study employed standardized and validated research instruments, including the Stress Appraisal Measure (SAM), the Coping Inventory for Stressful Situations (CISS), and the Technology Acceptance Model (TAM).

Study Limitations and Ethical Considerations

The study focused on nursing attendants and registered nurses working in the intensive care unit (ICU) of the chosen Davao del Norte tertiary hospital or hospitals. Strict ethical guidelines are followed in this study to protect each participant's rights, welfare, and dignity. The Data Privacy Act of 2012 (Republic Act No. 10173), which guarantees the protection, anonymization, and confidentiality of all institutional and personal data, is aligned with ethical standards.

RESULTS AND DISCUSSION

SOP 1. What are the demographic characteristics of the nurses and nursing attendants, in terms of age, gender, sex, highest educational attainment, and years of experience?

The majority of the respondents were female (77.2%), aged 29–34 years and 35–40 years (28% each), held a college degree (80.7%), and had 0–5 years of work experience (46.5%). These findings indicate that the respondents were predominantly early- to mid-career female nurses with undergraduate educational qualifications.

SOP 2. What is the level of post-pandemic stress among nurses and nursing attendants, in terms of primary appraisal, secondary appraisal and coping strategies?

The findings revealed that nurses experienced a descriptive level of post-pandemic stress in both primary appraisal (WM = 3.61) and secondary appraisal (WM = 3.78). Among the coping strategies, task-oriented coping (WM = 4.12) was the most frequently used, followed by avoidance-oriented coping (WM = 3.78), while emotion-oriented coping (WM = 3.03) was the least utilized. These findings suggest that healthcare institutions should strengthen stress management and resilience-building programs and reinforce effective task-oriented coping strategies to enhance nurses' well-being and professional performance.

SOP 3. What is the level of technological shifts among nurses and nursing attendants, in terms of performance expectancy, effort, social influence, facilitating conditions, behavioral intention, and use behavior?

The results showed that nurses perceived technological shifts at a descriptive level for performance expectancy (WM = 3.99), social influence (WM = 3.90), facilitating conditions (WM = 3.83), behavioral intention (WM = 3.96), and use behavior (WM = 3.75). However, effort expectancy (WM = 2.65) was only somewhat descriptive, indicating that nurses still encountered moderate challenges in using healthcare technologies.

SOP 4. Is there a significant relationship between technological shifts and post-pandemic stress among nurses and nursing attendants?

The study found a significant moderate positive relationship between technological shifts and post-pandemic stress ($r = 0.67$, $p = 0.000$). This indicates that increases in technological shifts were associated with higher levels of post-pandemic stress among nurses and nursing attendants.

SOP 5. Is there a significant difference in the level of technological shifts among ICU nurses and nursing attendants when grouped according to their demographic characteristics?

The findings revealed no significant differences in the perceived level of technological shifts when respondents were grouped according to age ($p = 0.114$), gender ($p = 0.755$), sex ($p = 0.755$), highest educational attainment ($p = 0.110$), and years of experience ($p = 0.653$). Therefore, demographic characteristics did not significantly influence nurses' and nursing attendants' perceptions of technological shifts.

SUMMARY

This study investigated the relationship between post-pandemic stress and technological shifts among ICU nurses and nursing attendants in selected tertiary hospitals in the Philippines using a quantitative descriptive-correlational research design. The findings showed that respondents experienced a moderate level of post-pandemic stress, primarily managed through task-oriented coping, while generally demonstrating positive acceptance of healthcare technologies despite experiencing some difficulties with technology use. A significant moderate positive relationship was found between technological shifts and post-pandemic stress, suggesting that adapting to new healthcare technologies is associated with increased stress among nurses. However, no significant differences were observed in the perceived impact of technological shifts when respondents were grouped by demographic characteristics, highlighting the need for comprehensive stress management, digital competency training, and continuous institutional support.

CONCLUSIONS

The study concludes that ICU nurses and nursing attendants continue to experience a moderate level of post-pandemic stress as they adapt to rapid technological changes in healthcare. Although respondents generally recognized the benefits of healthcare technologies and primarily relied on task-oriented coping strategies, challenges related to technology usability remain evident. Furthermore, technological shifts were found to be significantly associated with post-pandemic stress, whereas demographic characteristics were not significantly associated with nurses' perceptions of technological changes.

RECOMMENDATIONS

Based on the findings and conclusions of the study, the following recommendations are suggested:

1. Healthcare institutions should strengthen stress management programs and provide continuous training on emerging healthcare technologies to help nurses effectively adapt to workplace demands while promoting their well-being and professional competence.
2. Future researchers are encouraged to replicate this study using larger and more diverse samples and to examine additional variables to further expand knowledge on post-pandemic stress and technology adoption among nurses.

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AI DECLARATION STATEMENT

I declare that any artificial intelligence (AI) tools used in this study were employed solely to assist with language refinement and organization, while all research design, data collection, analysis, interpretation, and final content remain my own original work..

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